SERVICE MANUAL

DC Inverter Split Air-Condition Unit

Table of Contents

1. Air conditioning unit parameters 1-1

2. Units operating working conditions and temperature range 2-1

3. Units characteristic 3-1

4. Indoor and outdoor units size 4-1

5. Indoor and outdoor unit explosion diagram and spare parts list 5-1

6. The analysis of indoor malfunction code 6-1

7. The analysis of the complete units malfunction code 7-1

1、Air conditioning unit parameters

1. DC Inverter single series

(Including cooling only and heat pump)

115V/230V 60Hz

CS-25V1A-H1 CS-35V1A-E2 CS-50V9A-S CS-70V9A-T

Capacity (BTU)	Inverter 9K	Inverter 12K	Inverter 18K	Inverter 24K
Cooling	9000	12000	18000	24000
Heating	11000	15000	19000	24500
SEER	18	18	17.17	15.69
HSPF	8.6	8.7	8.7	8.5
EER Cooling/COP Heating	4.0/3.7	4.0/3.6	3.60/3.60	2.87/3.18
Op Range Cool °F	5~131	5~131	5~131	5~131
Op Range Heat °F	minus 4 ~ 109	minus 4 ~ 109	minus 4 ~ 109	minus 4 ~ 109
Remote control setting temp.range °F	61~90	61~90	61~90	61~90
Dehumidification (Pts/hr)	1.58	2.11	2.989	4.4
Voltage	115/60	115/60	230/60	230/60
Current (A) Rated/Max Cooling	5.5/9.32	7.53/10.8	5.929/10.1	11.09/12.22
Heating	7.1/9.8	10.4/13.0	6.732/9.31	10.24/12.23
Power Consumption (KW)Rated/Max Cooling	0.61/1.06	0.862/1.236	1.345/2.3	2.504/2.765
Heating	0.8/1.11	1.19/1.496	1.532/2.124	2.314/2.768
Max Overload Protection	20	20	20	25
Indoor Air Circulation: L / M / H(CFM)	212/270/315	341/382/430	441/530/618	518/588/677
Indoor Noise level dB(A): L / M / H	42/38/35	42/38/35	50/47/44	50/47/44
Outdoor Fan Speed (RPM)	100~900	100~900	100~900	100~900
Outdoor Noise Level dB(A)	~57	~57	~57	~57
Indoor Fan Speeds	950/1150/1300	750/900/1000	950/1100/1230	1080/1180/1280
Connection Method	Flare	Flare	Flare	Flare
Max Pipe Length (Ft.)	82ft/25m	82ft/25m	82ft/25m	82ft/25m
Max Elevation (Ft.)	32.8 Ft/10m	32.8 Ft/10m	32.8 Ft/10m	32.8 Ft/10m
Pipe Size (In.)	1/4" / 3/8"	1/4" / 1/2"	3/8" / 5/8"	3/8" / 5/8"
Service Port Connection (In.)	1/2"	1/2"	1/2"	1/2"
Indoor Dimensions W x D x H(In.)	33.4×13.4×9.8	38.4×14.3×11.0	45.8×15.2×12.0	52.0×15.6×12.0
Indoor Package Dimensions W x D x H(In.)	33.9×13.8×10.4	39.0×14.8×11.8	46.3×15.6×12.6	52.6×16.1×12.6
Indoor Net Weight (lbs.)	22	31	40	44
Indoor Gross Weight(lbs.)	26	37	51	55
Outdoor Dimensions W x D x H(In.)	35.6×12.7×22.6	38.6×15.7×26.0	38.2×15.6×29.9	40.2×17.1×34.1
Outdoor Package Dimensions W x D x H(In.)	36.2×13.2×23.0	39.2×16.3×26.8	39.0×16.1×30.3	40.6×17.3×37.8
Outdoor Net Weight (lbs.)	73	106	123	143
Outdoor Gross Weight(lbs.)	77	117	132	154
Refrigerant	R410A	R410A	R410A	R410A

2、Units operating working conditions and temperature range

2.1 Rated conditions

The Standard condition is in accordance with ANSI/AHAM RAC-1-2003, and UL 484.

Cooling:

Indoor: 80°FDB 67°F WB

Outdoor: 95°F DB 75°F WB

Heating:

Indoor: 70°F DB 60°F WB

Outdoor: 47°F DB 43°F WB

2.2 Operating Limits

		Outdoor
Cooling	Upper limit (DB)	110°F
	Lower limit (DB)	5°F
Heating	Upper limit (DB)	75°F
	Lower limit (DB)	5°F
Voltage	2PH	198–264V/115V
	3PH	N/A

3、Units characteristic

☆ Wide operating range with outdoor air temperatures up to -15℃ in cooling for the Heat pump

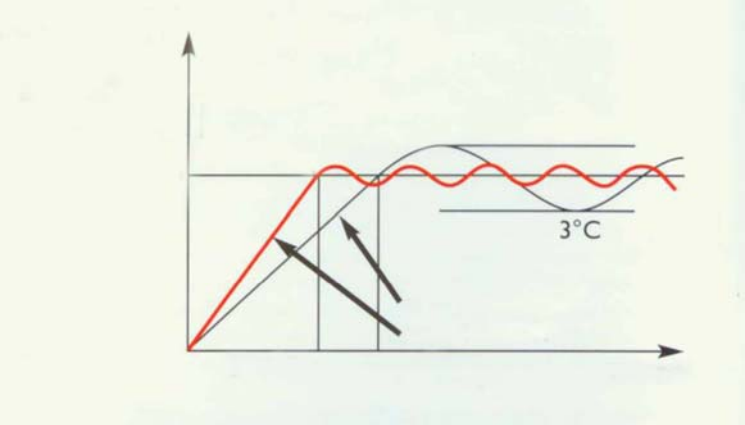
☆ High efficiency and energy saving

☆ Auto-restart after a power supply blackout

☆ Single-phase power supply thanks to DC inverter technology low consumption

☆ Dynamic refrigerant control by DC inverter compressor and circuit, electronic valve and fuzzy logic managed by a powerful micro program

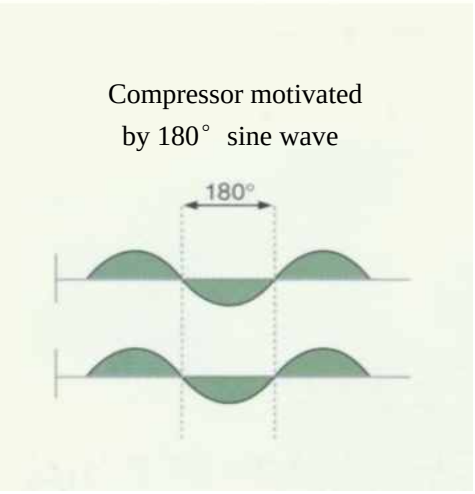
☆ EEV for each indoor unit



We leaded to adapt 180° sine wave with permanently magnetic and synchronized Brushless motor, compressor motivated from 120° square wave control to 180° sine wave. These contribute higher efficiency, lower power consumption and noise.

High precision of flow control valve, with large range of flow, accurate control, these could implement automatically control to refrigerant and help system always run at the best condition..

Compressor motivated by 180° sine wave



Compared with the on/off unit, DC inverter has the advantage of fast refrigeration of calefaction, accurate temperature control, reliable system, high efficiency and so on.

Energy-saving

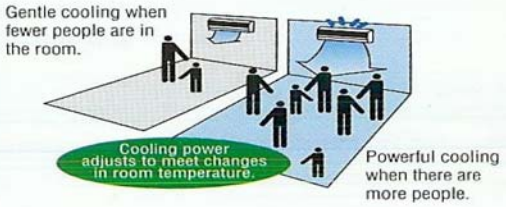
For optimum use of limited energy resources, an inverter air conditioner features an inverter circuit providing extremely efficient operation. So even though you get speedy, flexible operation, you use less electricity. What's more, low energy consumption means operation that's more environment-friendly than ever.

Flexible power control & Energy saving

The graph shows the CS-E21EKU's wide power output range during heating.

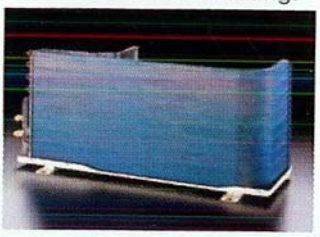
Flexible power control

You're always comfortable with an inverter air conditioner. After quickly reaching the set temperature, it finely adjusts output power to maintain a constant temperature. So there are no uncomfortable temperature swings, while electricity is used more efficiently. Broad output power capability also assures continued comfort even if the number of people in a room changes.


Gentle cooling when fewer people are in the room.
Cooling power adjusts to meet changes in room temperature.
Powerful cooling when there are more people.

❷ Anti-Corrosion Condenser

Condensers can take a beating from exposure to salty air, rain and other corrosive factors.
Panasonic has lengthened the life of our condensers with our new anti-rust coating.



Round form

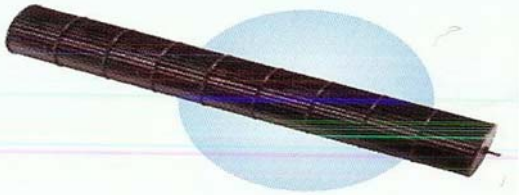
The white body and sleek design have a pleasant, hygienic appearance.

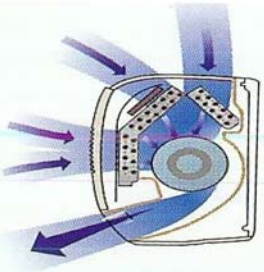
Removable, Washable Panel

The front panel is easy to keep clean.
It removes quickly with a simple one-step operation and can be washed in water.

Cross-Flow Fan

The Excelent air flow path is due to the exceptionally wide diameter of our cross flow fan.
This maintains super-quiet operation while the increased airflow sends clean, comfortable air to every corner of the room.

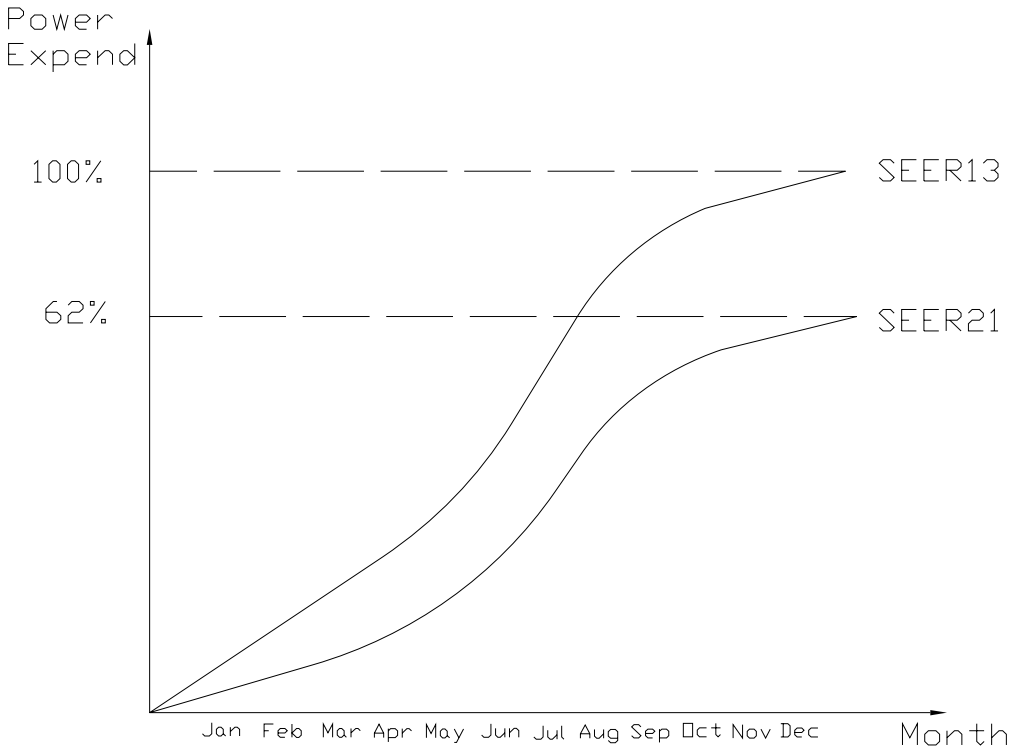




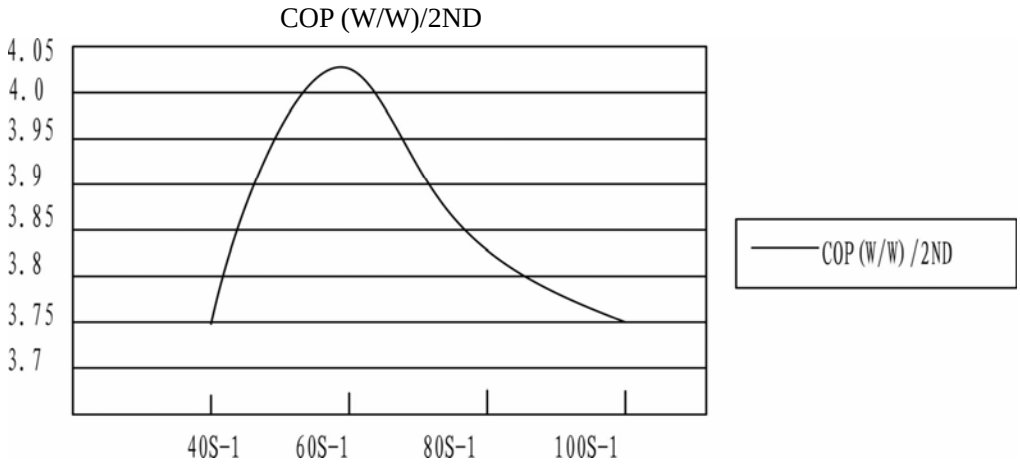
Double-Bend Heat Exchanger

This structure gives the heat exchanger a large surface area for higher efficiency.
With 15 rows of copper piping, the double-bend heat exchanger helps to ensure the air the unit takes in will be cooled or heated, resulting in high heat exchange efficiency.

In fact , the new CS is a high efficiency DC inverter technology outdoor unit，its SEER is as high as 21 for the 12K unit。 when compared to SEER13 ， it can save electricity 38% in a year.



The curve diagram of the compressor energy consumption



The curve diagram of the compressor condensing pressure

APPENDIX

・For DC Inverter Compressors the following shall be strictly obeyed.

1. Prevention of motor demagnetizing

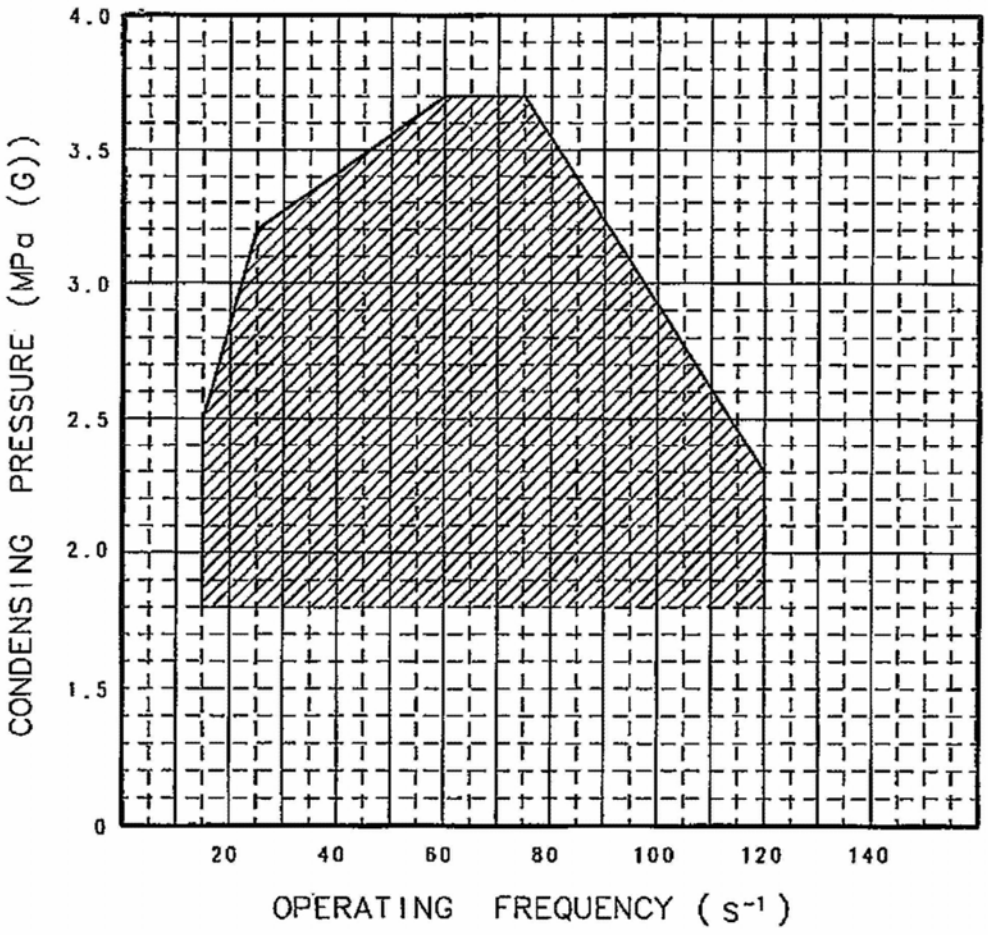
1-1. Peak Current of Motor : 48 A Max.

* Never exceed for a moment.

1-2. Discharge Temp. : 110 ℃ Max.

2. Compressor Revolution & Condensing Pressure (Reference)

The compressor shall be operated under the diagonal conditions.



Cooling Capacity (BTU)---Run Model,230/115V,Indoor fan at high speed

INDOOR ENTERING AIR DB/WB TEMPERATURE [^{0}F]						
OUTDOOR ENTERING AIR DB TEMPERATURE[^{0}F]	**DATA**	**72/59**	**75/63**	**81/66**	**84/70**	**90/73**
14~68 (protection range)	TC	80 - 110 % of nominal				
	SC	80 - 105 % of nominal				
	PI	25 - 50 % of nominal				
77	TC	11616	12336	13104	13872	14640
	SC	10421	10603	10845	11027	11269
	PI	0.72	0.73	0.75	0.76	0.77
86	TC	11040	11808	12576	13296	14064
	SC	10118	10361	10542	10785	10966
	PI	0.81	0.82	0.83	0.85	0.86
95	TC	10464	11232	12000	12768	13536
	SC	9876	10058	10300	10542	10724
	PI	0.88	0.90	0.92	0.93	0.94
104	TC	9936	10704	11424	12192	12960
	SC	9634	9815	10058	10239	10482
	PI	0.97	0.98	0.99	1.01	1.02
115	TC	9264	10032	10752	11520	12288
	SC	9270	9512	9694	9936	10118
	PI	1.07	1.08	1.09	1.11	1.13

LEGEND

TC – Total Cooling Capacity, BTU SC – Sensible Capacity, BTU PI – Power Input, kW

WB – Wet Bulb Temp., (^{0}**F**) DB – Dry Bulb Temp., (^{0}**F**) ID – Indoor OD – Outdoor

Heating Capacity (KW)---Run Model,230V,Indoor fan at high speed

ID COIL ENTERING AIR DB TEMPERATURE [^{0}F]				
OD COILENTERING AIR DB/WB TEM PERATU RE[^{0}F]	**DATA**	**59**	**68**	**77**
5/3	TC	8960	8260	7700
	PI	0.66	0.73	0.80
14/10	TC	9940	9240	8680
	PI	0.80	0.87	0.95
20/18	TC	10640	10080	9380
	PI	0.91	0.97	1.04
30/28	TC	11060	10500	9800
	PI	0.96	1.02	1.08
36/34	TC	11340	10640	10080
	PI	0.99	1.06	1.12
45/43	TC	14560	14000	13440
	PI	1.04	1.11	1.18
50/48	TC	15400	14840	14140
	PI	1.11	1.18	1.25
59/54	TC	16240	15680	14980
	PI	1.16	1.22	1.30
59~75 (Protection Range)	TC	85 - 105 % of nominal		
	PI	80 - 120 % of nominal		

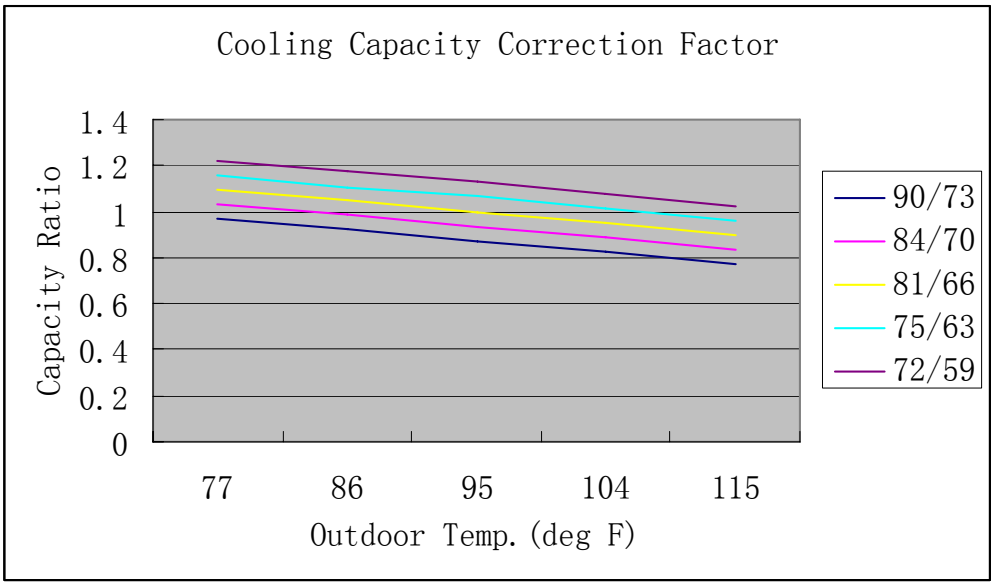
LEGEND

TC – Total Cooling Capacity, BTU SC – Sensible Capacity, BTU PI – Power Input, kW

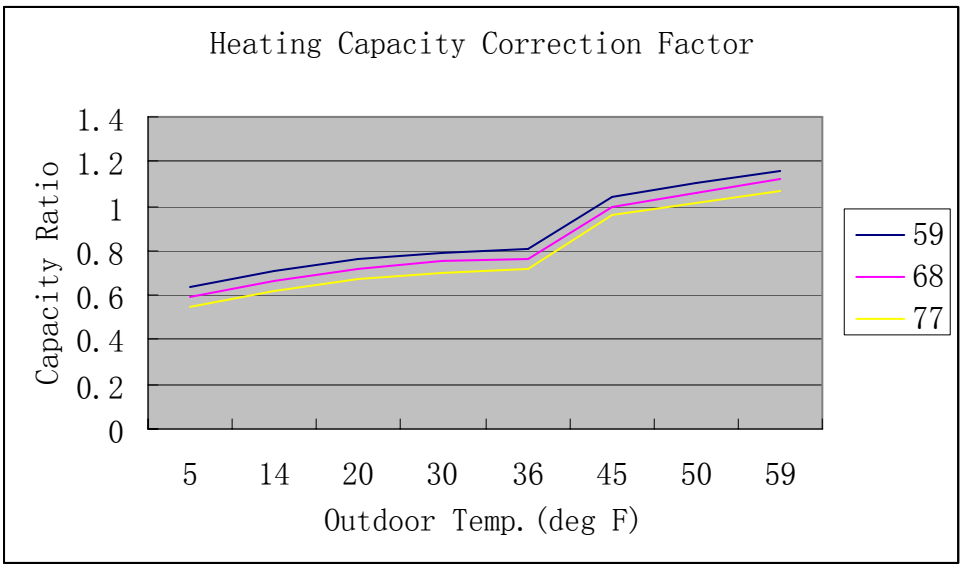
WB – Wet Bulb Temp., (^{0}**F**) DB – Dry Bulb Temp., (^{0}**F**) ID – Indoor OD – Outdoor

Capacity Correction Factors

Cooling Capacity Ratio Vs. Outdoor Temperature

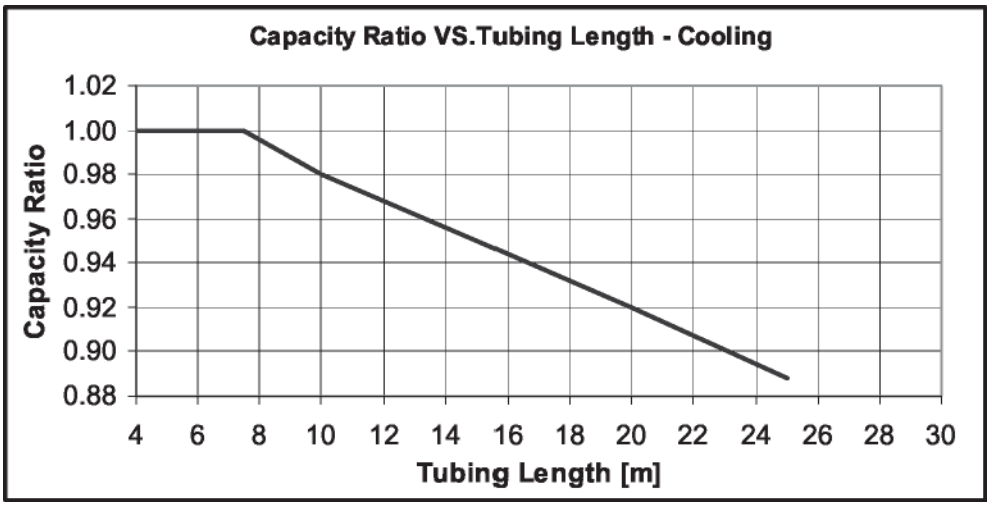


Heating Capacity Ratio Vs. Outdoor Temperature

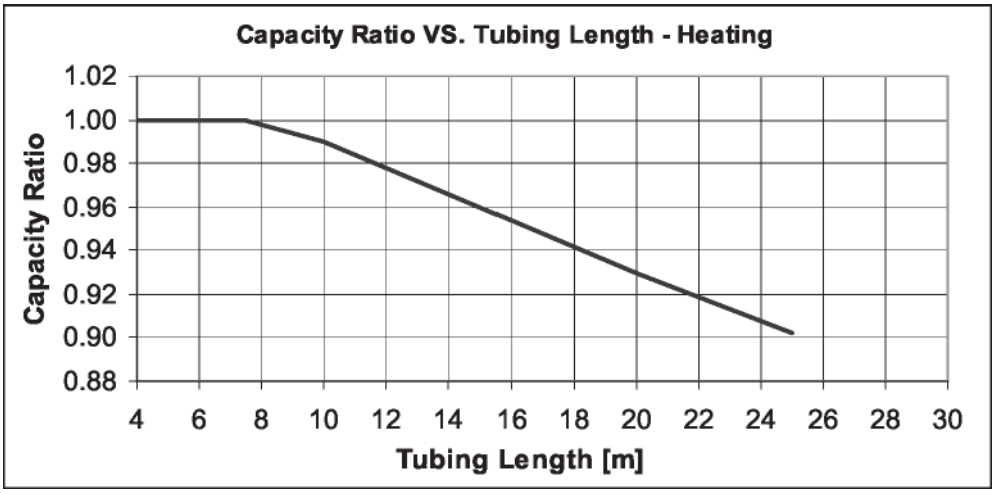


Capacity Correction Factor Due to Tubing Length (One Way)

Cooling

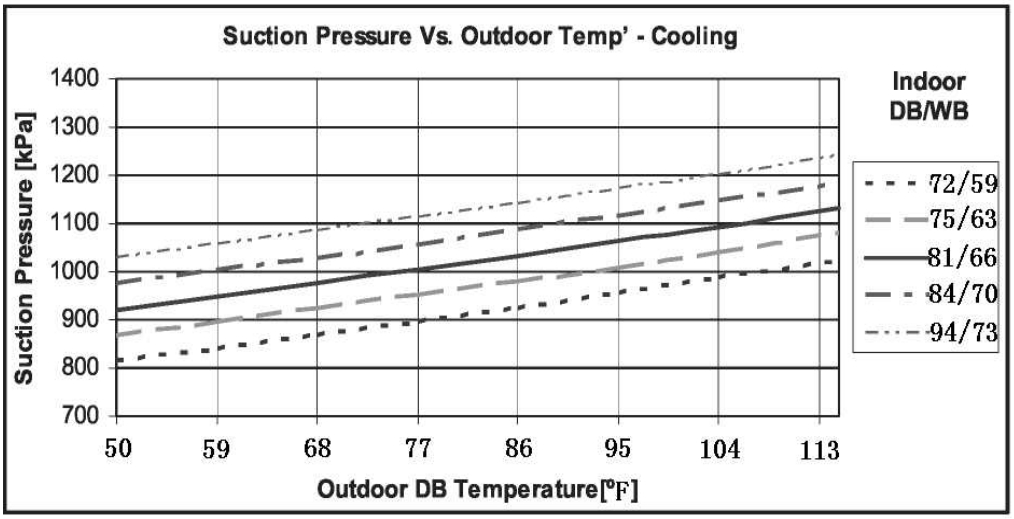


Heating

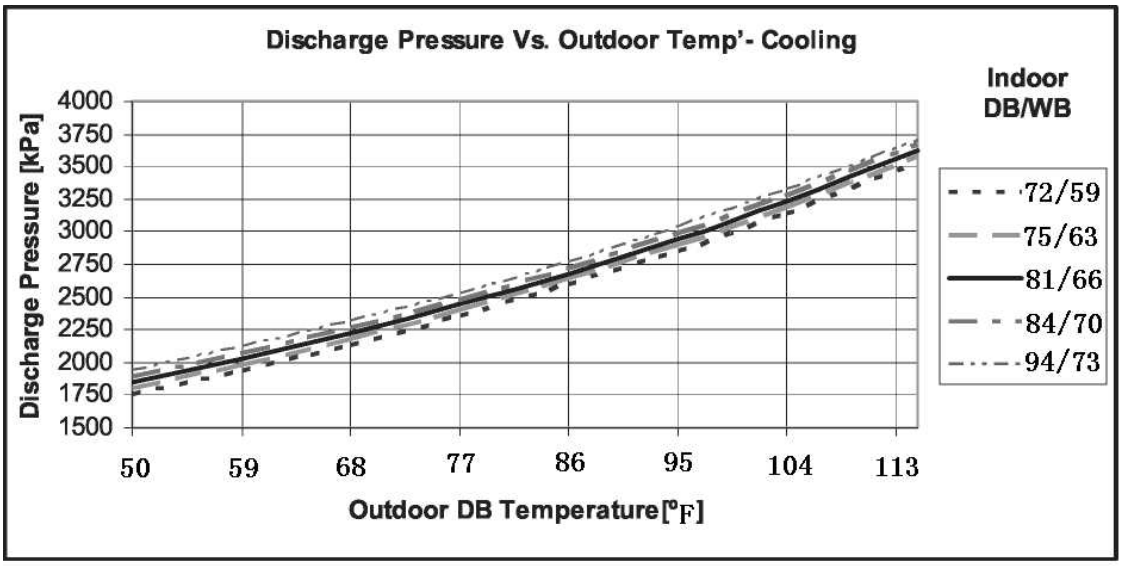


Pressure Curve

Suction Pressure Curve



Discharge Pressure Curve



ELECTRICAL DATA

Model	CS-25V1A-H1
Power Supply	1 PH, 115 VAC,60Hz
Connected to	Outdoor
Maximum Current	9.3A
Inrush Current	40A
Starting Current	1A
Circuit breaker	20A
Power supply wiring - No. x cross section	1 X 3 X 2.5 mm^2
Interconnecting cable - No. x cross section	2 X 4 X 1 mm^2

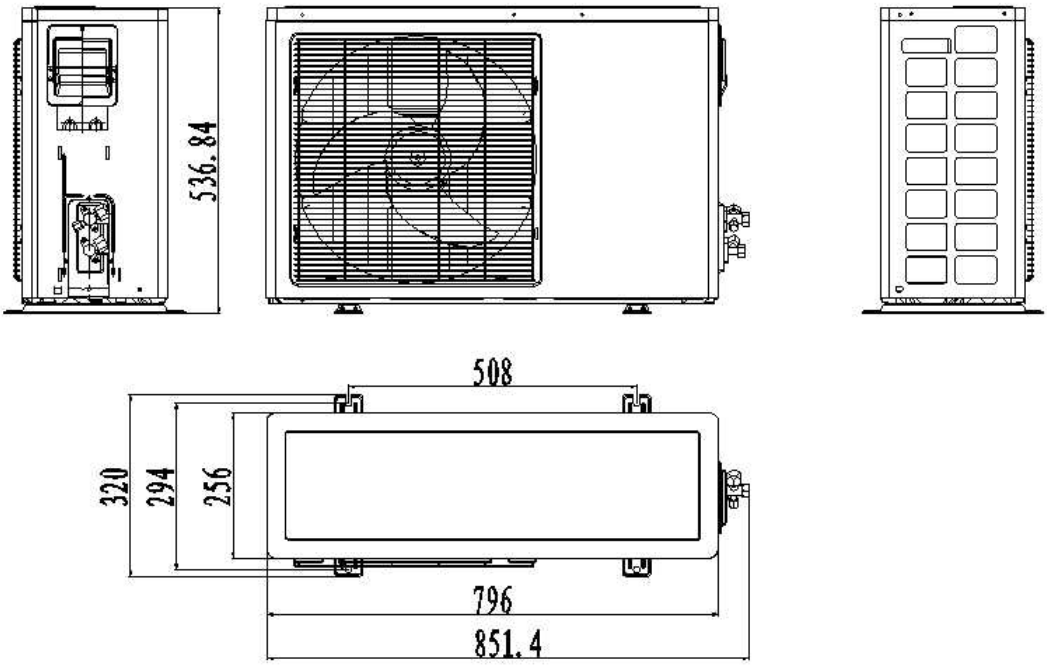
Model	CS-35V1A-E2
Power Supply	1 PH, 115 VAC,60Hz
Connected to	Outdoor
Maximum Current	10.8A
Inrush Current	40A
Starting Current	1A
Circuit breaker	20A
Power supply wiring - No. x cross section	1 X 3 X 2.5 mm^2
Interconnecting cable - No. x cross section	2 X 4 X 1 mm^2

Model	CS-50V9A-S
Power Supply	1 PH, 230 VAC,60Hz
Connected to	Outdoor
Maximum Current	10.1A
Inrush Current	40A
Starting Current	1A
Circuit breaker	20A
Power supply wiring - No. x cross section	1 X 3 X 2.5 mm^2
Interconnecting cable - No. x cross section	2 X 4 X 1 mm^2

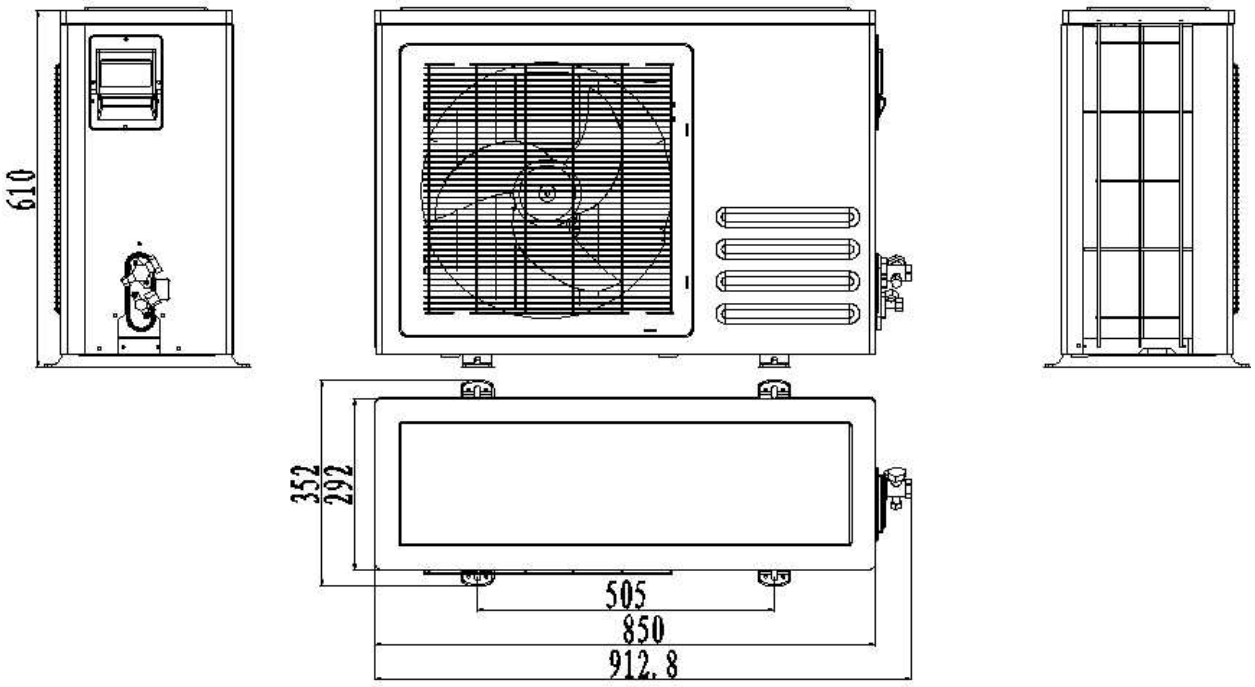
Model	CS-70V9A-T
Power Supply	1 PH, 230 VAC,60Hz
Connected to	Outdoor
Maximum Current	12.2A
Inrush Current	35A
Starting Current	1A
Circuit breaker	20A
Power supply wiring - No. x cross section	1 X 3 X 2.5 mm^2
Interconnecting cable - No. x cross section	2 X 4 X 1 mm^2

4、Indoor and outdoor units size

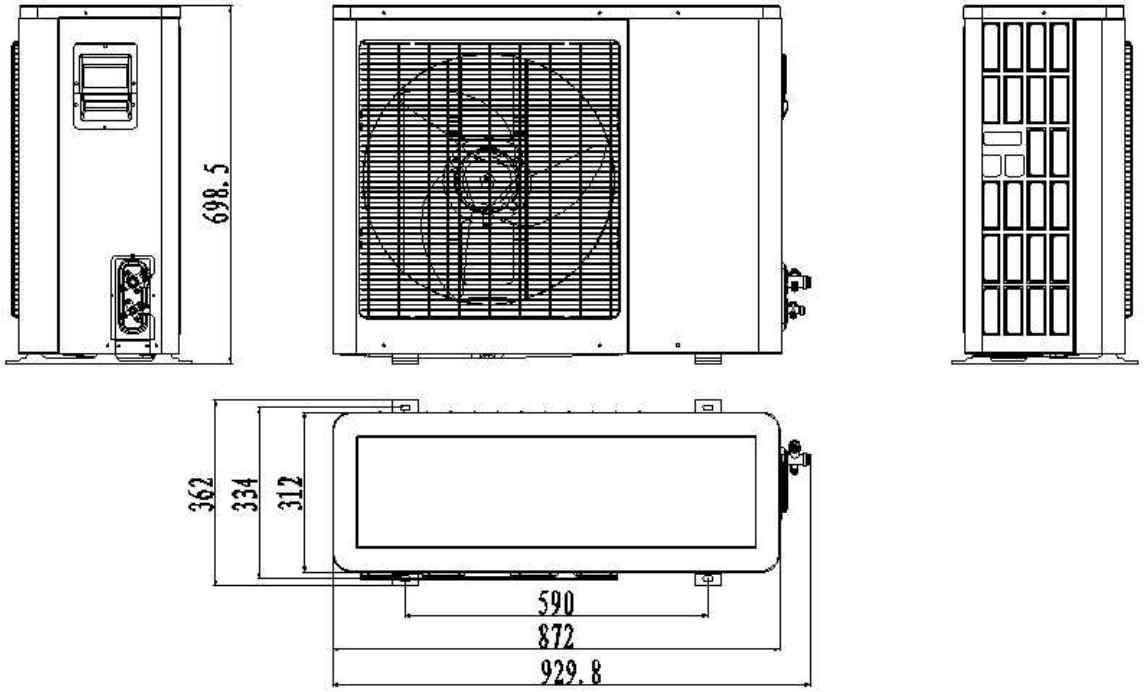
4.1 outdoor Unit: CS-25V1A-H1



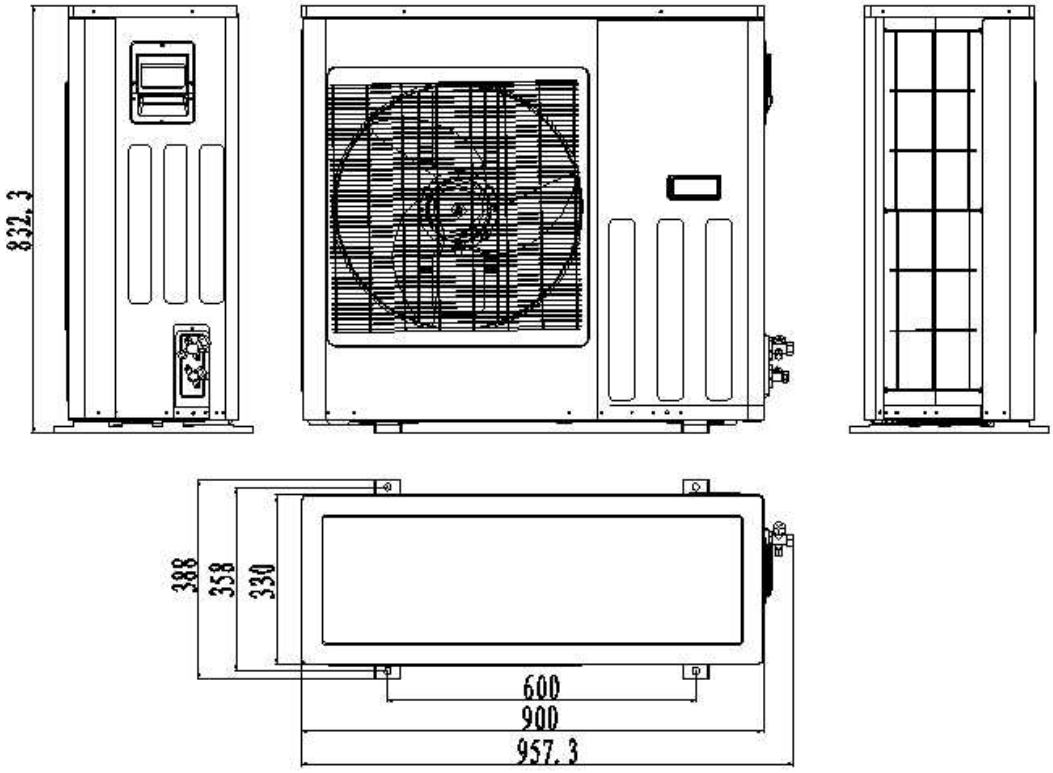
4.2 outdoor Unit: CS-35V1A-E2



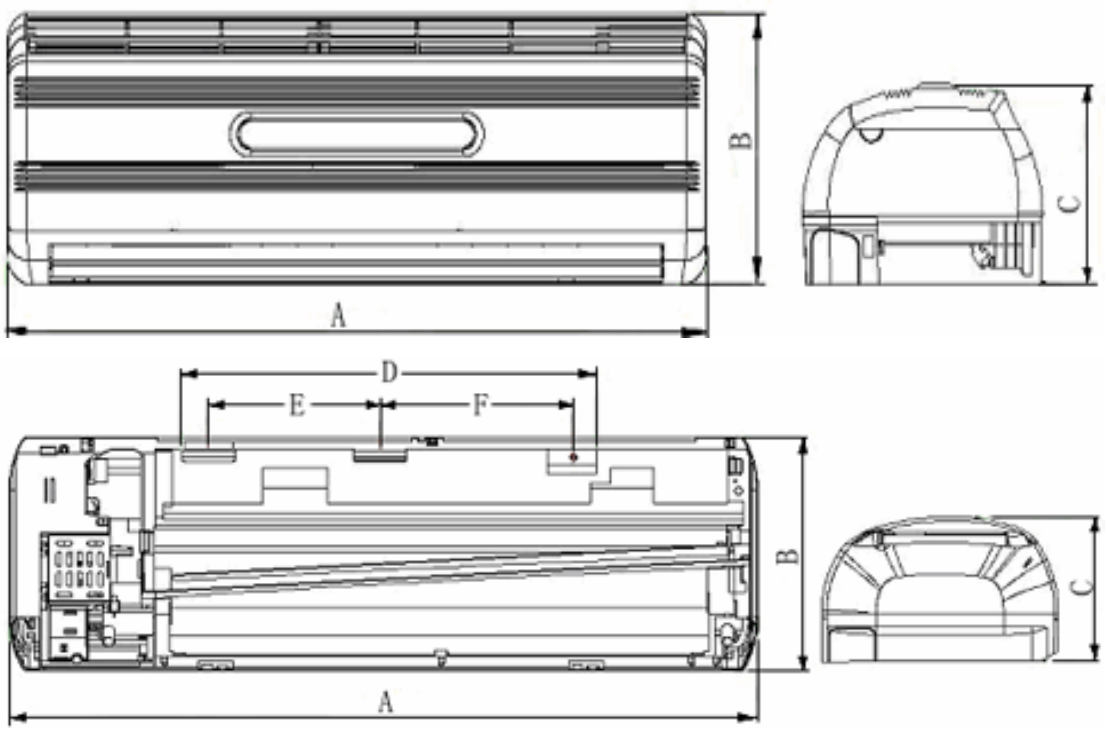
4. 3 outdoor Unit: CS-50V9A-S



4.4 outdoor Unit: CS-70V9A-T



4.5（Indoor unit）figure、mounting dimensions

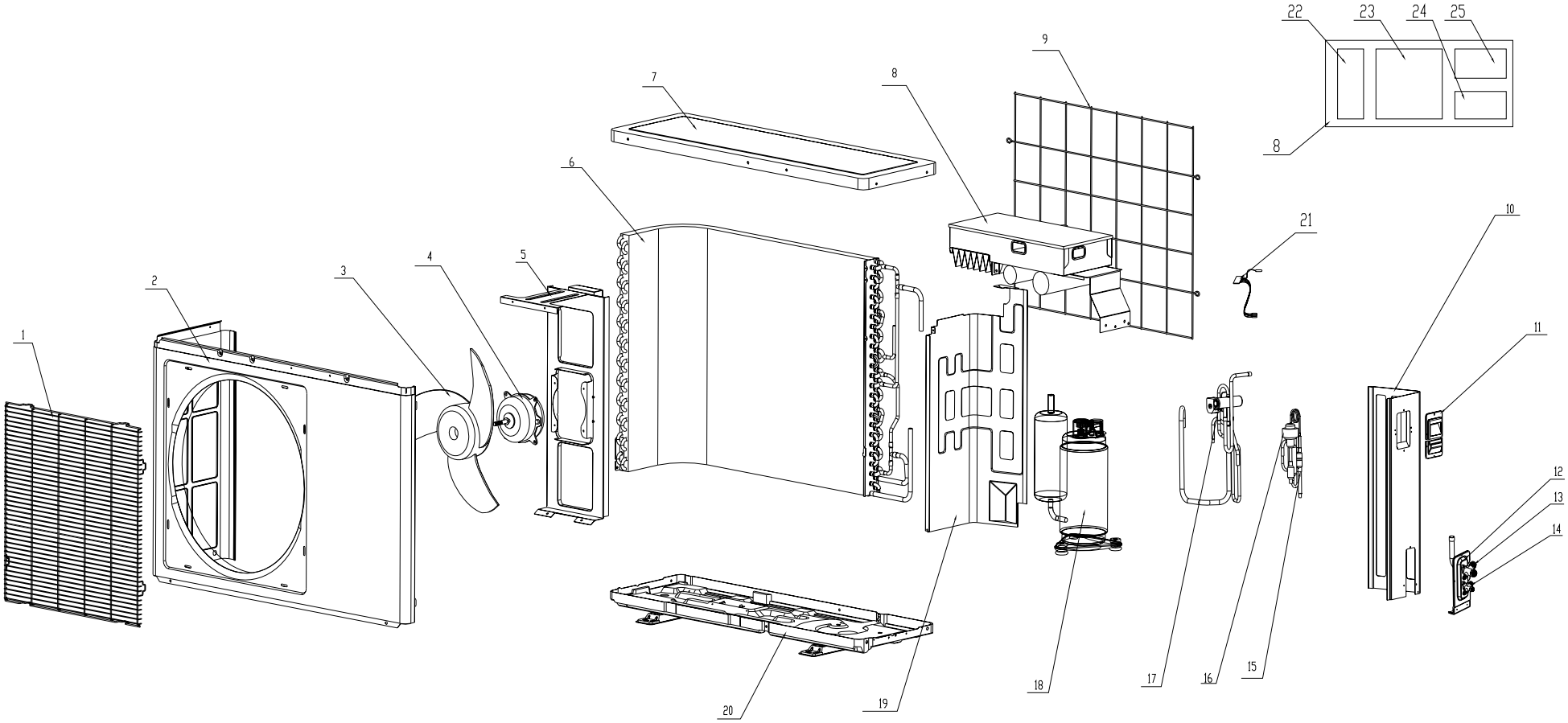


A unit：mm

Size symbol / Indoor model	Machine body size			mounting dimensions		
	A	B	C	D	E	F
CS-25V1A-M	800	280	195	490	/	/
CS-35V1A-P	900	296	220	583	257.5	257.5
CS-50V9A-S（W）	1068(1080)	325(305)	240(214)	700(696)	305(305)	315(315)
CS-70V9A-Q	1225	325	245	685	311.5	311.5

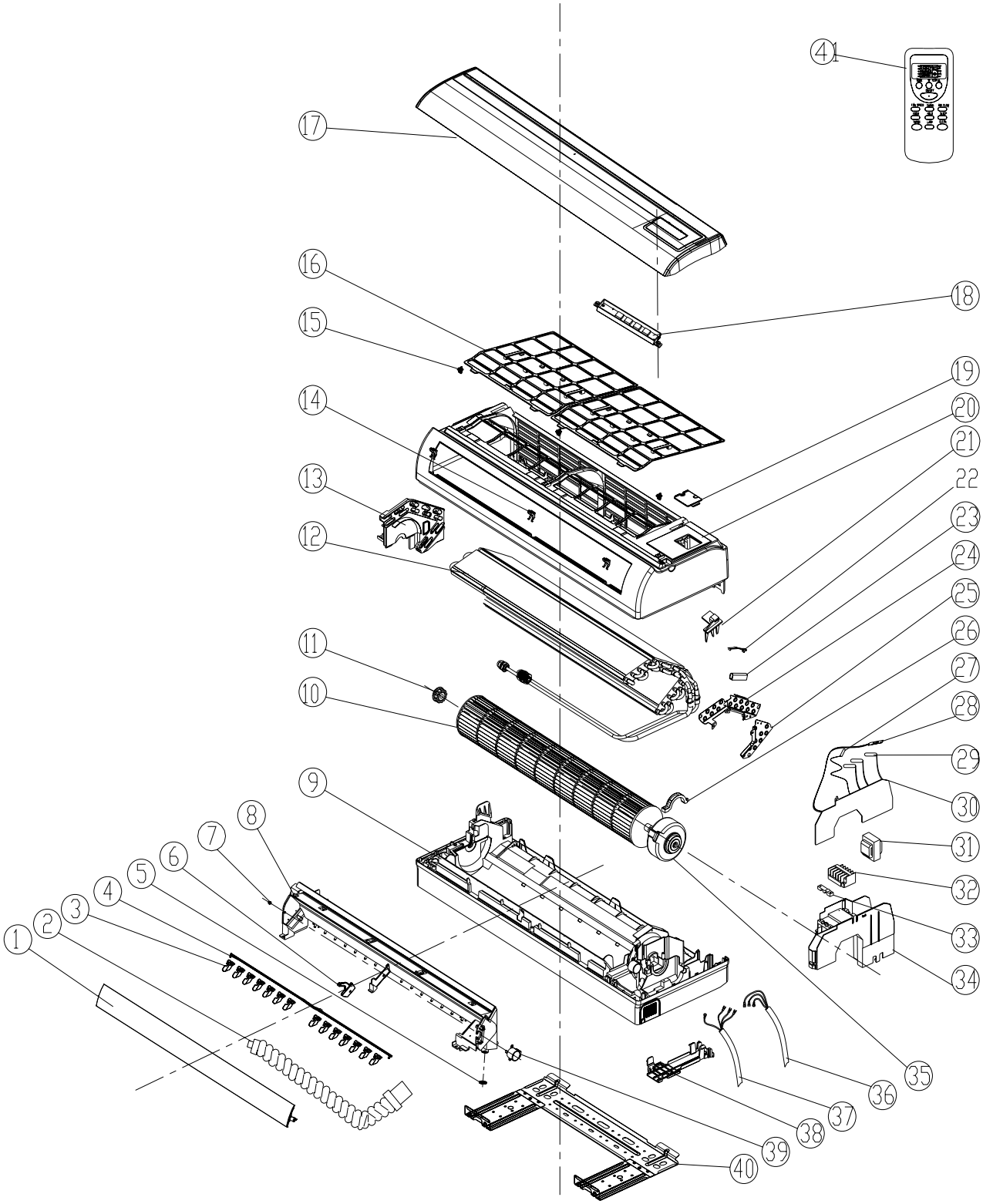
5、 Indoor and outdoor unit explosion diagram and spare parts list

5.1、The explosion diagram and spare parts list for CS-25V1A-H1



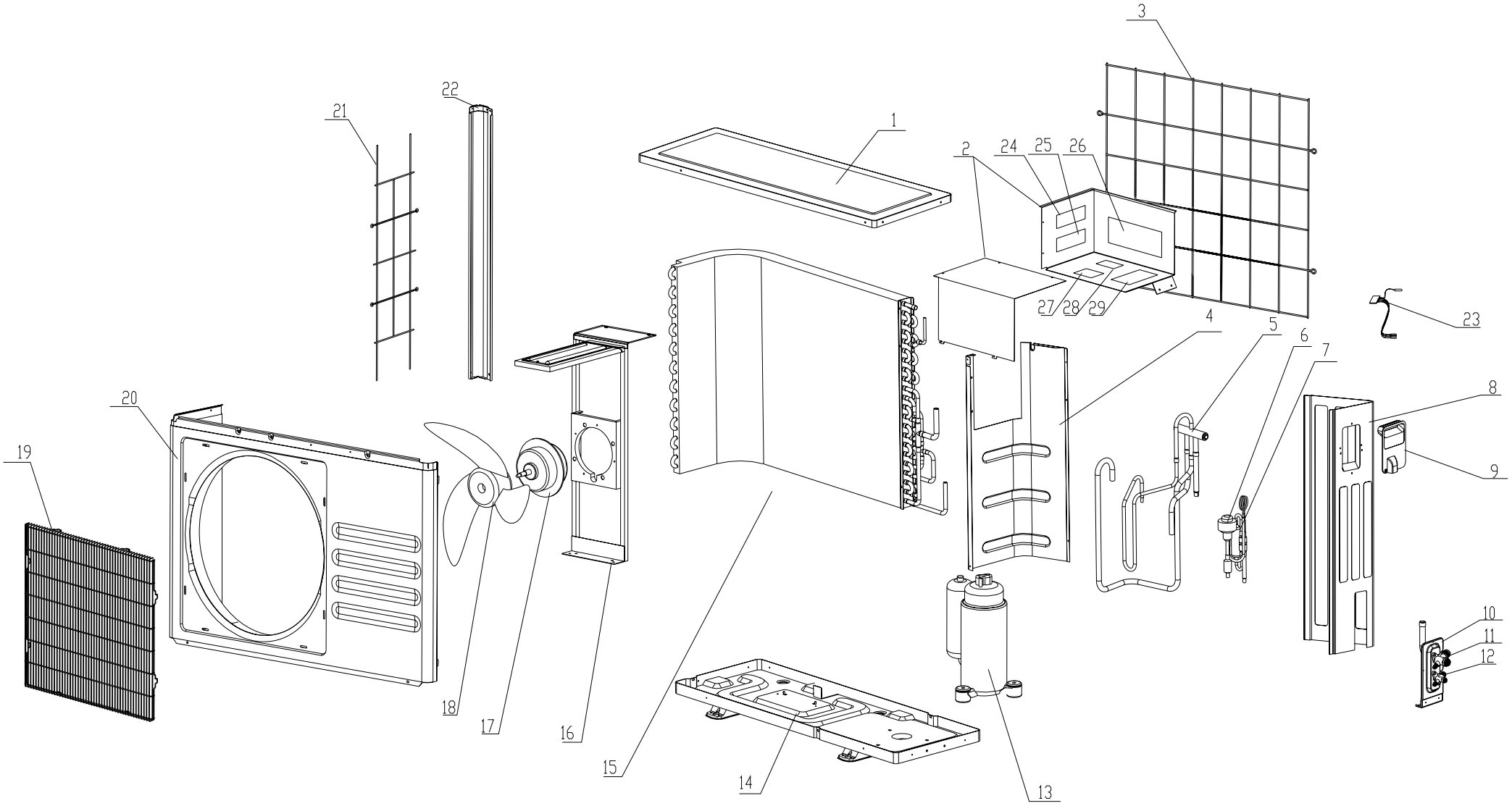
25	模块板	IPM board	1
24	PFC板	PFC board	1
23	主板	CPU mainboard	1
22	滤波板	filter board	1
21	传感器	temperature sensor	1
20	底盘	Base	1
19	中隔板	Partition board	1
18	压缩机	Compressor	1
17	四通阀组件	Four-way valve assembly	1
16	电子膨胀阀	Electronic expansion valve	1
15	毛细管组件	Capillary Assy	1
14	高压阀	Ligh-pressure valve	1
13	低压阀	Low-pressure valve	1
12	阀座板	Valve installation plate	1
11	电器盒盖	Top of the Electric box	1
10	右侧板	Right panel	1
9	背网	Rear Grill	1
8	电控盒	Electric box	1
7	顶盖板	Top panel	1
6	冷凝器	Condenser	1
5	电机支架	Motor support	1
4	电　机	Motor	1
3	轴流风轮	Axial flow fan	1
2	面　板	Front Plate	1
1	前网罩	Front Grill	1
序号 (Serial Number)	description	名称(Part Name)	数量 (Number)

5.2 、The explosion diagram and spare parts list for CS-25V1A-M81A



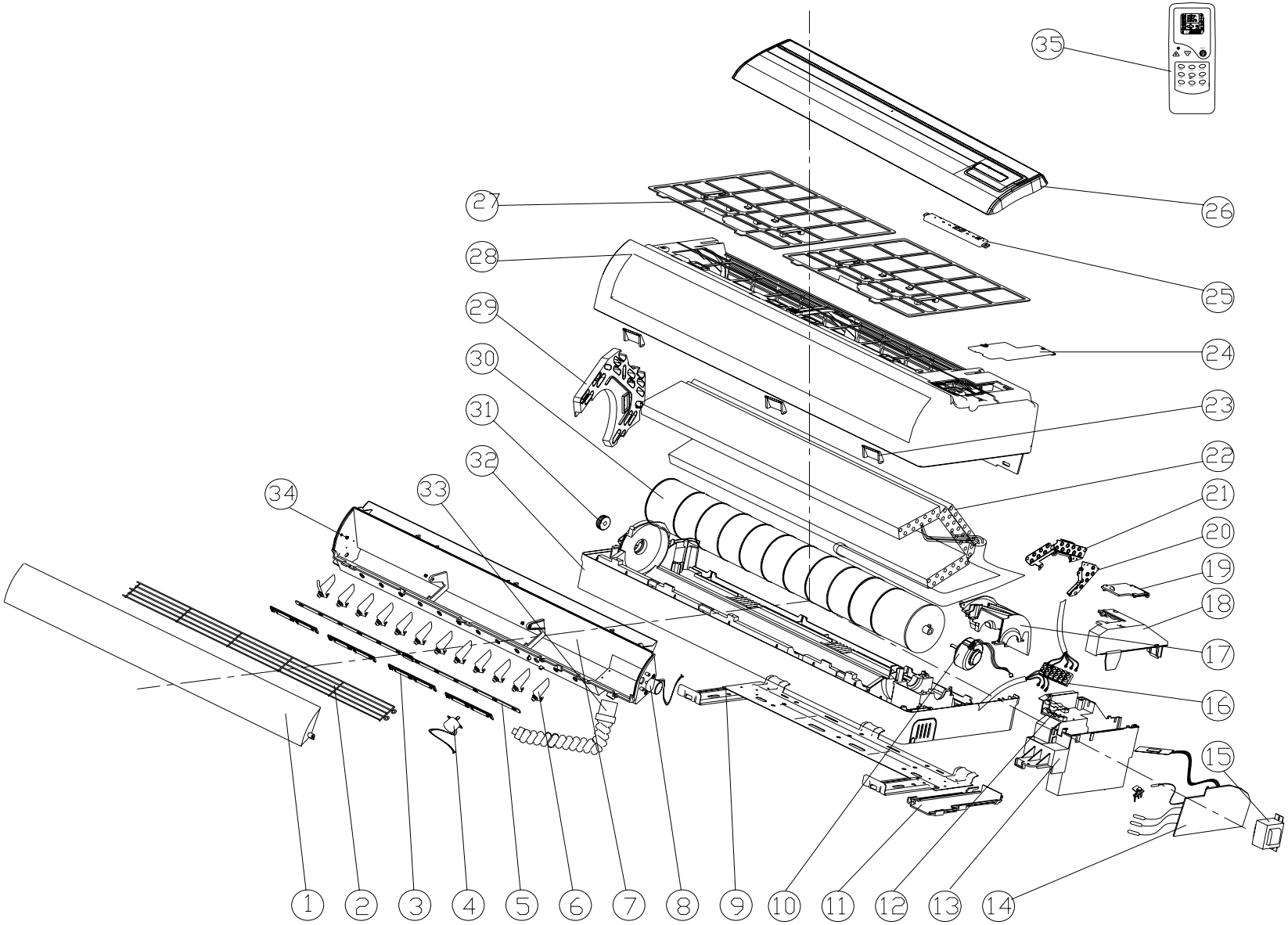
41	遥控器	Remote controller	1
40	挂墙板	wall-mounting frame	1
39	步进电机	Step motor	1
38	压管板	Pipe Clamp	1
37	室内外连接电缆	Connecting Cable	1
36	电源线	Power Cord	1
35	室内电机	Indoor motor	1
34	主控盒	Electric Box	1
33	压线扣	Wire Clip	1
32	端子台	Terminal Board	1
31	变压器	Transformer	1
30	电控板	Electric control plate	1
29	室温探头	Room Temp. Sensor	1
28	显示灯板	Display lamp panel	1
27	管温探头	Tube Temp. Sensor	1
26	电机压板	Motor platen	1
25	蒸发器右端板2	Evaporator right plate 2	1
24	蒸发器右端板1	Evaporator right plate 1	1
23	探头铜管	Copper pipe of sensor	1
22	探头弹簧	Spring of sensor	1
21	管温探头架	Tube temp. Sensor Holder	1
20	中框	Middle frame	1
19	中框盖板	Middle frame coverplate	1
18	显示盒	Displqy box	1
17	面板	Front Panel	1
16	过滤网	Air Filter	2
15	附扣	Clip	3
14	螺钉盖	Screw cover	3
13	蒸发器塑料左端板	Evaporator plastic left plate	1
12	蒸发器	Evaporator	1
11	轴承座		1
10	贯流风轮	Cross flow fan	1
9	底座	Base	1
8	出风主体	Outlet part	1
7	导风条轴套	Guide Bearing	1
6	导风条中支撑杆		1
5	出水嘴防水环		1
4	连杆	Connecting lever	2
3	导风叶片	Swing louver	14
2	保温水管	Heat preservaton water pipe	1
1	品目名		1

5.3、The explosion diagram and spare parts list for CS-35V1A-E2



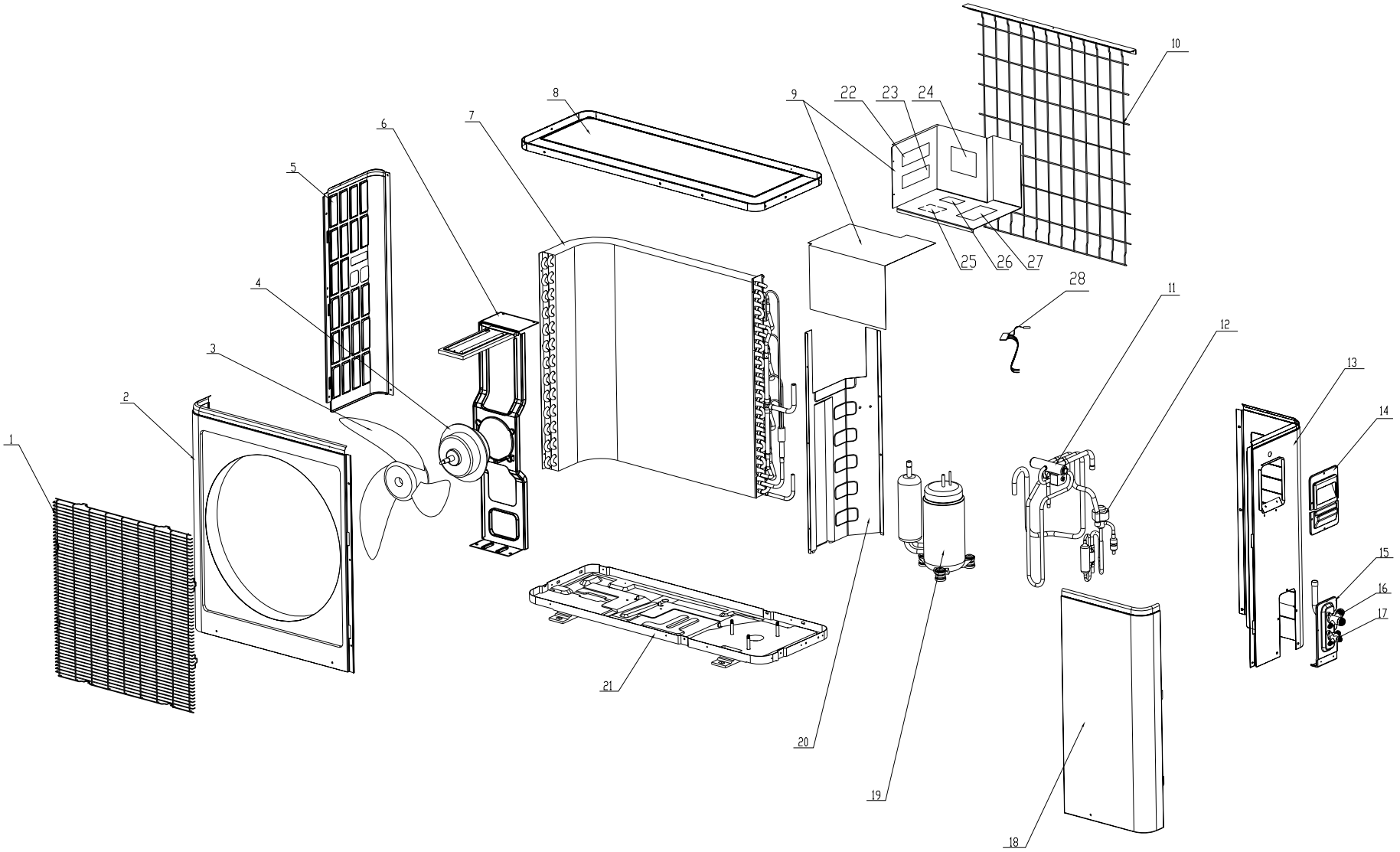
29	滤波板	filter board	1
28	滤波器	filter	1
27	PFC电感	PFC reactor	1
26	主板	CPU mainboard	1
25	模块板	IPM board	1
24	PFC板	PFC board	1
23	传感器	temperature sensor	1
22	左侧板	Left panel	1
21	左护网	Left protect net	1
20	前面板	Front Plate	1
19	前网罩	Front Grill	1
18	轴流风机	Axial flow fan	1
17	电机	DC Motor	1
16	电机支架	Motor support	1
15	冷凝器	Condenser	1
14	底盘	Base	1
13	压缩机	Compressor	1
12	高压阀	High-pressure valve	1
11	低压阀	Low-pressure valve	1
10	阀座板	Valve installation plate	1
9	大抽手	Large handle	1
8	右侧板	Right panel	1
7	干燥过滤器	Desiccation filter	1
6	电子膨胀阀	Electronic expansion valve	1
5	四通阀	Four-way valve	1
4	中隔板	Partition board	1
3	背网	Rear Grill	1
2	电控盒	Electric box	1
1	顶盖板	Top panel	1
序号 (Serial Number)	名称 (Part Name)		数量 (Quantity)

5.4、The explosion diagram and spare parts list for CS-35V1A-P81A



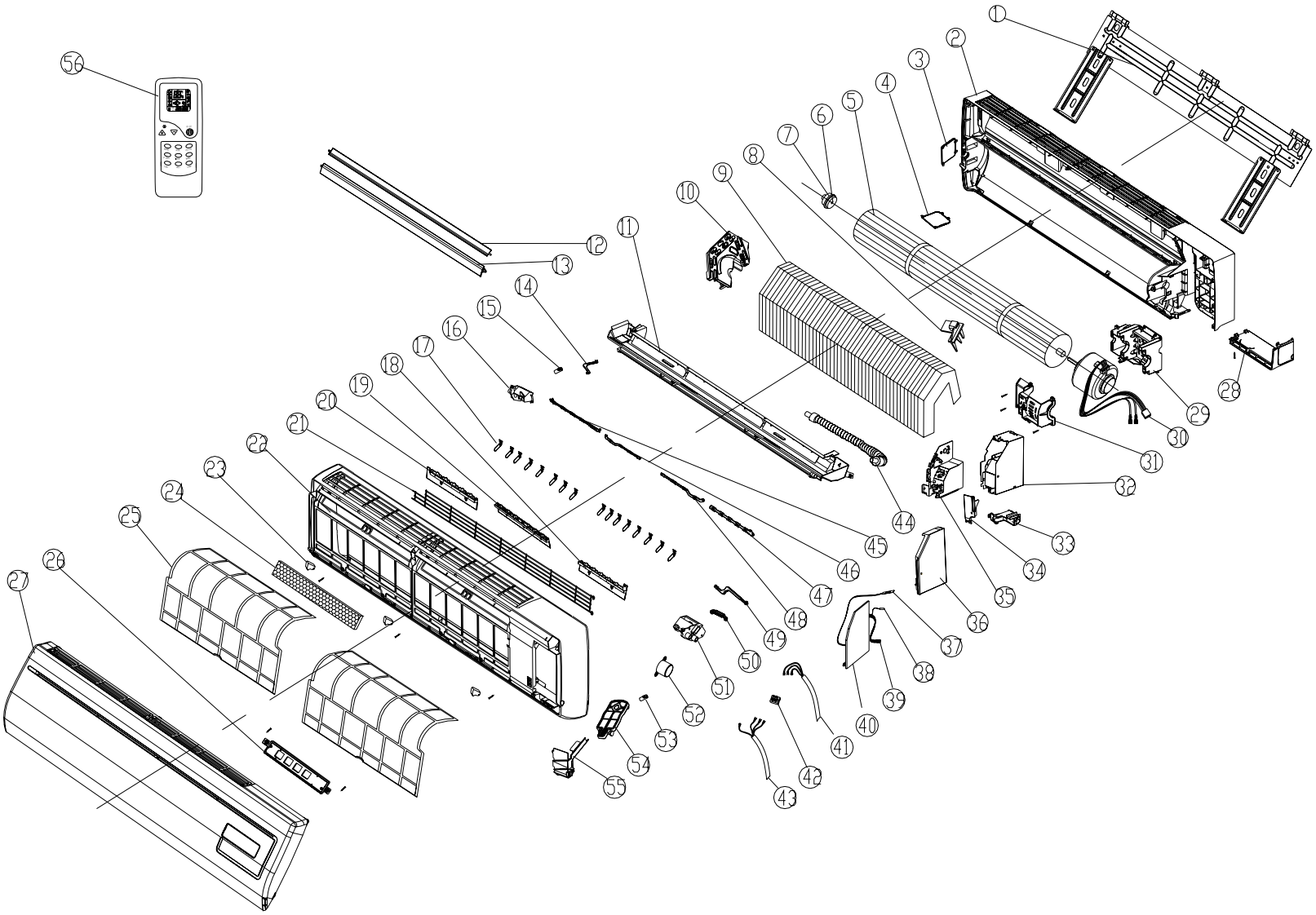
35	摇控器	Remote controller	1
34	轴　　套	Guide Bearing	3
33	水　　管	Water pipe	1
32	底　　座	Base	1
31	贯流风轮轴承	Bearing of cross flow fan	1
30	贯流风轮	Cross flow fan	1
29	左塑料端板	Left plastic plate	1
28	中　　框	Middle frame	1
27	过滤网	Air Filter	1
26	面板组件	Front Panel assembly	1
25	显示盒	Display box	1
24	中框盖板	Middle frame coverplate	1
23	螺钉盖	Screw cover	3
22	蒸发器组件	Evaporator assembly	1
21	蒸发器右端板1	Evaporator right plate 1	1
20	蒸发器右端板2	Evaporator right plate 2	1
19	电器盒盖活动板	Active board of electric box cover	1
18	电器盒盖	Electric box cover	1
17	电机压盖	Motor platen	1
16	端子台	Terminal Board	1
15	变压器	Transformer	1
14	电控板组件	Electric control plate_ass	1
13	电器盒	Electric Box	1
12	压线扣	Wire Clip	1
11	底座塑料压管板	Pipe Clamp	1
10	电　　机	Motor	1
9	挂墙板	wall-mounting frame	1
8	导风条电机	Louver motor	1
7	出风主体	Outlet part	1
6	导风叶片	Swing louver	12
5	摆风叶片连杆	Connecting rod	2
4	立体风电机	Third wind motor	1
3	摆风叶片卡条	Swing louver connecting lever	3
2	出风口防护网	Air outlet Grill	1
1	导风条	louver	1
序号 (Serial Number)	名称 (Part Name)		数量 (Quantity)

5.5、The explosion diagram and spare parts list for CS-50V9A-S



28	传感器	temperature sensor	1
27	滤波板	filter board	1
26	滤波器	filter	1
25	PFC电感	PFC reactor	1
24	主板	CPU mainboard	1
23	模块板	IPM board	1
22	PFC板	PFC board	1
21	底盘	Base	1
20	中隔板	Partition board	1
19	压缩机	Compressor	1
18	维修板	Maintenance plate	1
17	高压阀	Low-pressure valve	1
16	低压阀	High-pressure valve	1
15	阀座板	Valve installation plate	1
14	电器盒盖	Top of the Electric Box	1
13	右侧板	Right panel	1
12	电子膨胀阀	Electronic expansion valve	1
11	四通阀组件	Four-way valve assembly	1
10	背网	Rear Grill	1
9	电器盒	Electric box	1
8	顶盖板	Top panel	1
7	冷凝器	Condenser	1
6	电机支架	Motor support	1
5	左侧板	Left panel	1
4	电　机	Motor	1
3	轴流风轮	Axial flow fan	1
2	面　板	Front Plate	1
1	前网罩	Front Grill	1
序号 (Serial Number)	名称 (Part Name)		数量 (Quantity)

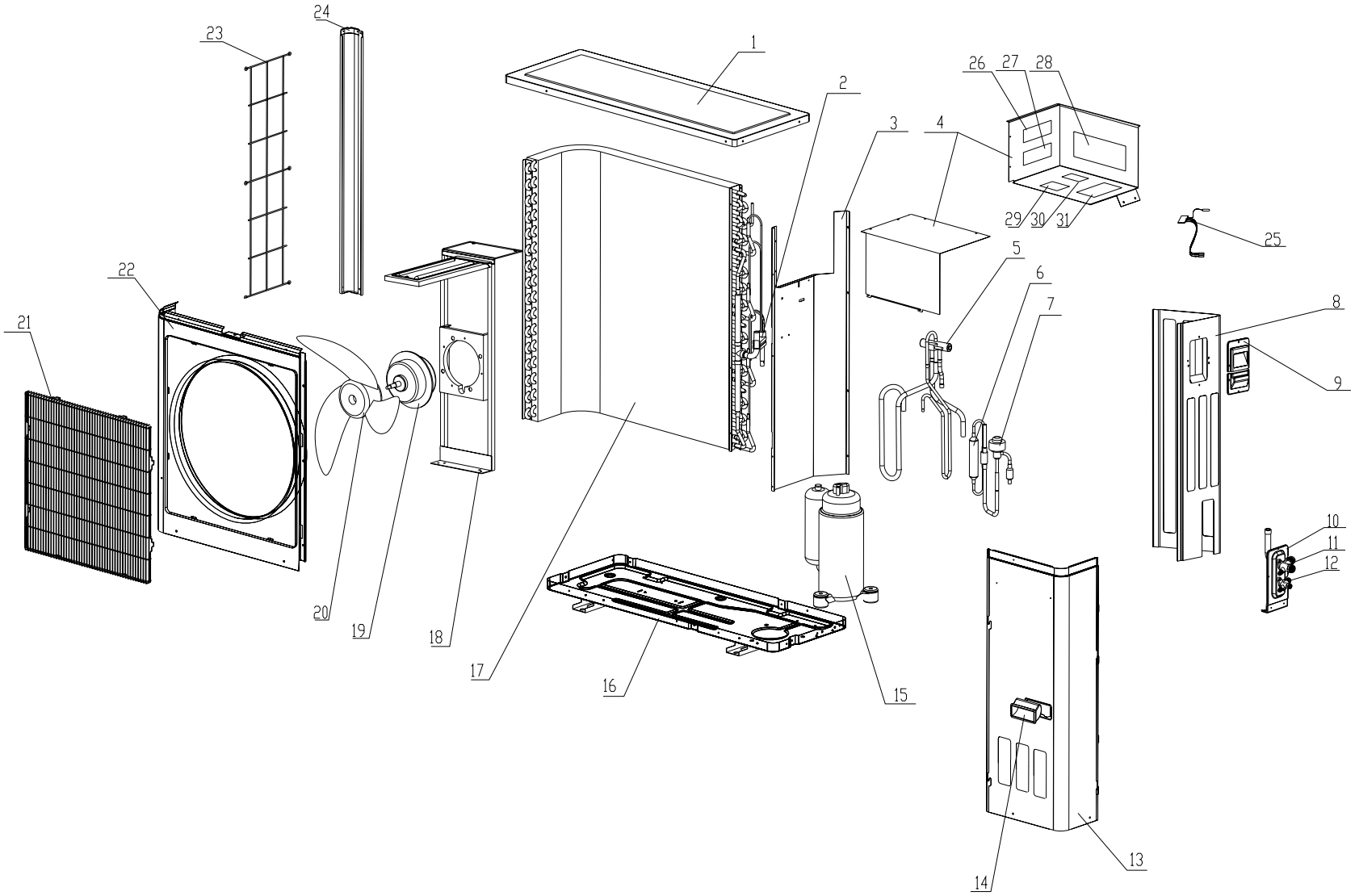
5.6、The explosion diagram and spare parts list for CS-50V9A-S81A



序号 (Serial Number)	名称 (Part Name)		数量 (Quantity)
28	右角板	Right angle plate	1
27	面板	Front Panel	1
26	显示盒	Display box	1
25	过滤网	Air filter	1
24	冷触媒	Cold Catalyst	1
23	螺钉盖	Screw cover	1
22	中框	Middle frame	1
21	风口护网	Air outlet protect net	1
20	导风叶片左支架	Swing louver left support	1
19	导风叶片中支架	Swing louver middle support	1
18	导风叶片右支架	Swing louver right support	1
17	导风叶片	Swing louver	2
16	步进电进左支架	Step motor left support	2
15	轴套A	Guide Louver Bearing A	3
14	左大连杆A	Left Connecting rod A	1
13	下导风条	Down louver	1
12	上导风条	Up Louver	1
11	出风主体	Outlet part	1
10	蒸发器左端板	Evaporator left plate	1
9	蒸发器组件	Evaporator Assy	1
8	室温探头架	Room temp. Sensor Holder	1
7	贯流风轮轴承胶圈	Ring of Bearing	
6	贯流风轮轴承	Fan Bearing	1
5	贯流风轮	Cross flow fan	1
4	前角板	Front angle plate	1
3	左角板	Left angle plate	1
2	底　座	Base	1
1	挂墙板	Wall-mounting frame	1

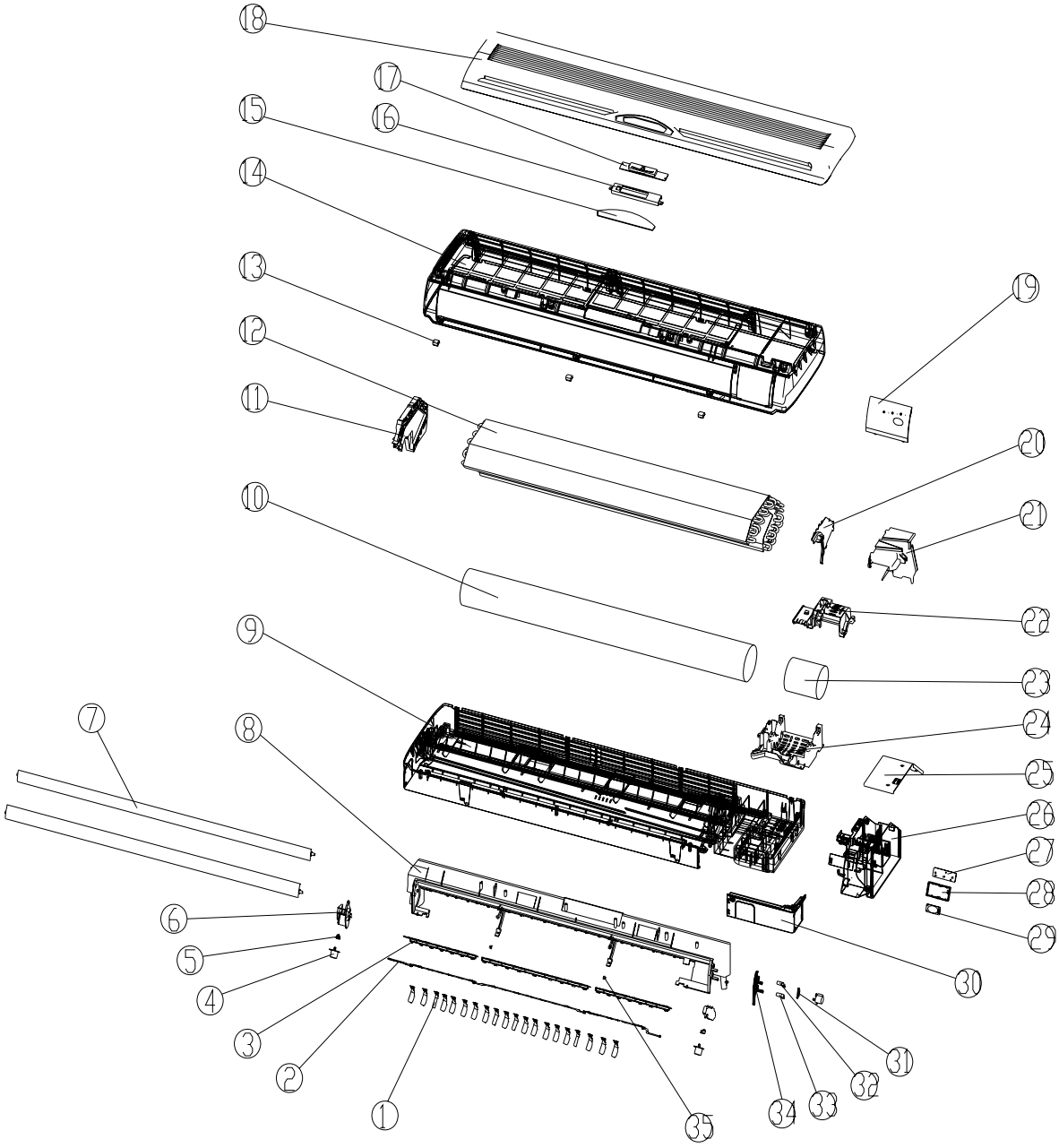
序号 (Serial Number)	名称 (Part Name)		数量 (Quantity)
56	遥控器	Remote controller	1
55	挡水板	Water-resistant board	1
54	压线扣	Wire Clip	1
53	轴套B	Bearing B	1
52	步进电机	Step motor	1
51	步进电机右支架	Step motor right support	3
50	右小连杆	Right small Connecting rod	1
49	右大连杆A	Right Connecting rod A	1
48	右大连杆B	Right Connecting rod B	1
47	右中连杆	Right middle Connecting rod	1
46	左中连杆	Left middle Connecting rod	1
45	左大连杆B	Left Connecting rod B	1
44	保温水管	Thermal insulation pipe	1
43	室外连接电缆线	Connecting cable	1
42	端子台	Terminal Board	1
41	电源线	Power cord	1
40	电控板	Electric control plate	1
39	管温探头	Tube Temp. Sensor	1
38	室温探头	Room Temp. Sensor	1
37	显示灯板	Display lamp plate	1
36	电器盒内件B	Electric box Panel B	1
35	电器盒内件A	Electric box Panel A	1
34	压线板	Wire Clamp	1
33	过线扣	Hook for the wire	1
32	电器盒	Electrical box	1
31	电机护盖	Motor cover	1
30	电机	Motor	1
29	电机固定座	Motor holder	1

5.7 The explosion diagram and spare parts list for CS-70V9A-T



31	滤波板	filter board	1
30	滤波器	filter	1
29	PFC电感	PFC reactor	1
28	主板	CPU mainboard	1
27	模块板	IPM board	1
26	PFC板	PFC board	1
25	传感器	temperature sensor	1
24	左侧板	Left panel	1
23	左护网	Left protect net	1
22	前面板	Front Plate	1
21	前网罩	Front Grill	1
20	轴流风机	Axial flow fan	1
19	电机	Motor	1
18	电机支架	Motor support	1
17	冷凝器	Condenser	1
16	底盘	Base	1
15	压缩机	Compressor	1
14	小抽手	Small handle	2
13	维修板	Maintenance plate	1
12	高压阀	High-pressure valve	1
11	低压阀	Low-pressure valve	1
10	阀座板	Valve installation plate	1
9	电器盒盖	Top of the Electric box	1
8	右侧板	Right panel	1
7	电子膨胀阀	Electronic expansion valve	1
6	干燥过滤器	Desiccation filter	1
5	四通阀	Four-way valve	1
4	电控盒	Electric box	1
3	中隔板	Partition board	1
2	减振块	Anti-vibration pad	1
1	顶盖板	Top panel	1
序号 (Serial Number)	名称 (Part Name)		数量 (Quantity)

5.8、The explosion diagram and spare parts list for CS-50V9A-S

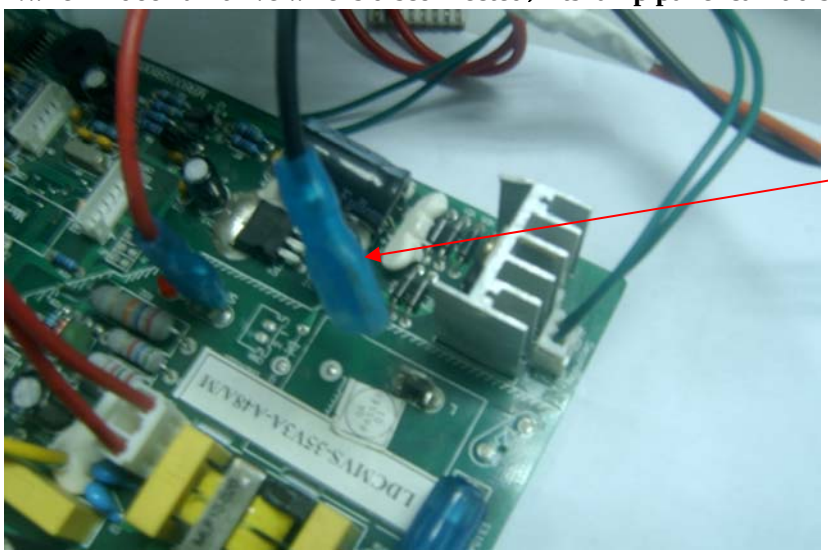


35	导风条轴承	Louver bearing	2
34	步进电机安装架B	Step motor mounting bracket B	1
33	步进电机轴套C	Step motor bearing C	1
32	步进电机轴套B	Step motor bearing B	1
31	步进电机连杆	Step motor connecting rod	1
30	角板	Horny board	1
29	灯架部件3	Lamp hanger sparts 3	1
28	灯架部件2	Lamp hanger sparts 2	1
27	灯架部件1	Lamp hanger sparts 1	1
26	电器盒	Electric box	1
25	电器盒盖	Electric box cover	1
24	电机底托	The motor's cork base	1
23	电机	Motor	1
22	电机护盖	Motor protection cover	1
21	挡水板	Water-resistant board	1
20	蒸发器右端板	The right plate of Evaporator	1
19	中框小盖板	Middle frame coverplate	1
18	面板	Front Panel	1
17	显示灯板	Display lamp panel	1
16	显示盒	Display box	1
15	显示镜片	Display eyeglass	1
14	中　框	Middle frame	1
13	螺钉盖	Screw cover	3
12	蒸发器组件	Evaporator assembly	1
11	蒸发器左端板	The left plate of Evaporator	1
10	贯流风轮	Cross flow fan	1
9	底座	Base	1
8	出风主体	Outlet main part	1
7	导风条	Louver	2
6	步进电机安装架A	Step motor mounting bracket A	2
5	步进电机轴套A	Step motor bearing A	2
4	步进电机	Step motor	3
3	连杆 2	Connecting rod 2	2
2	连杆 1	Connecting rod 1	2
1	导风叶片	Swing Louver	20
序号 (Serial Number)	名称 (Part Name)		数量 (Quantity)

6、The analysis of indoor malfunction code（internal wiring get loose, which will cause malfunction.）

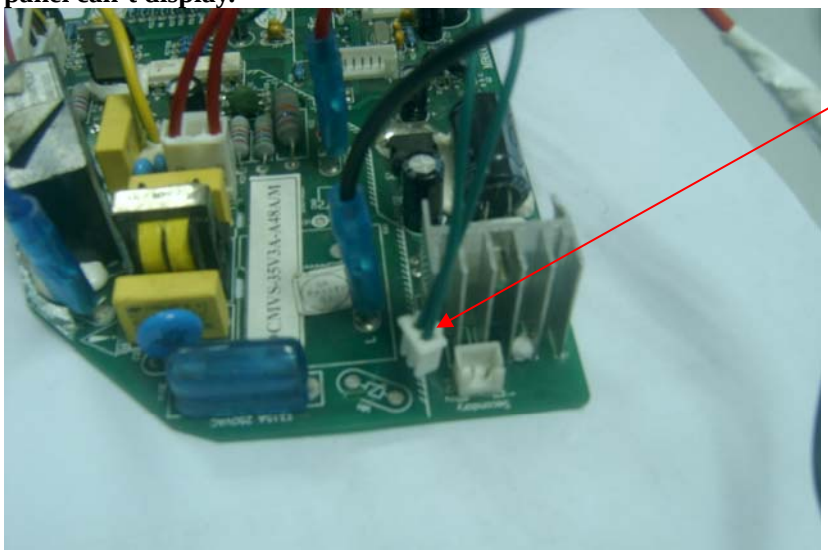
Ⅰ、indoor detailed malfunction

1.when indoor unit live wire is disconnected，its lamp panel can't display.

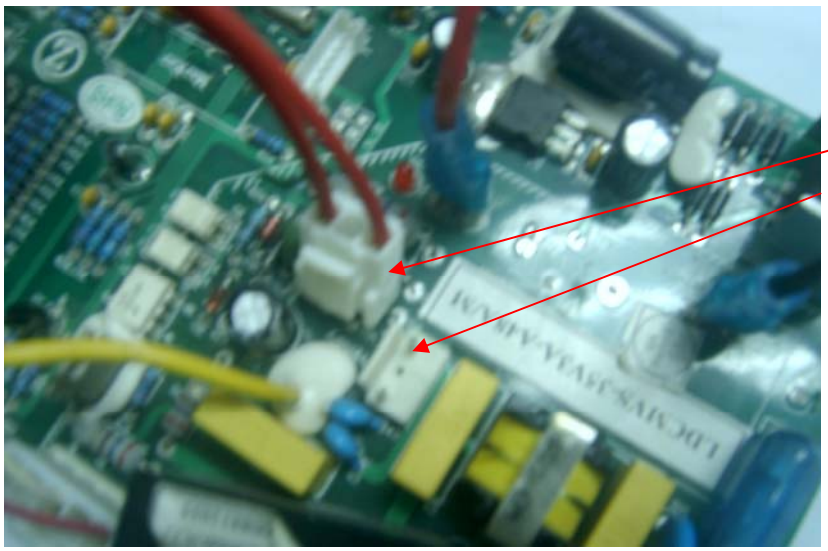


Live wire is off。

2.when the transformer's secondary and primary disconnect or indoor fuse is off，the indoor unit lamp panel can't display.

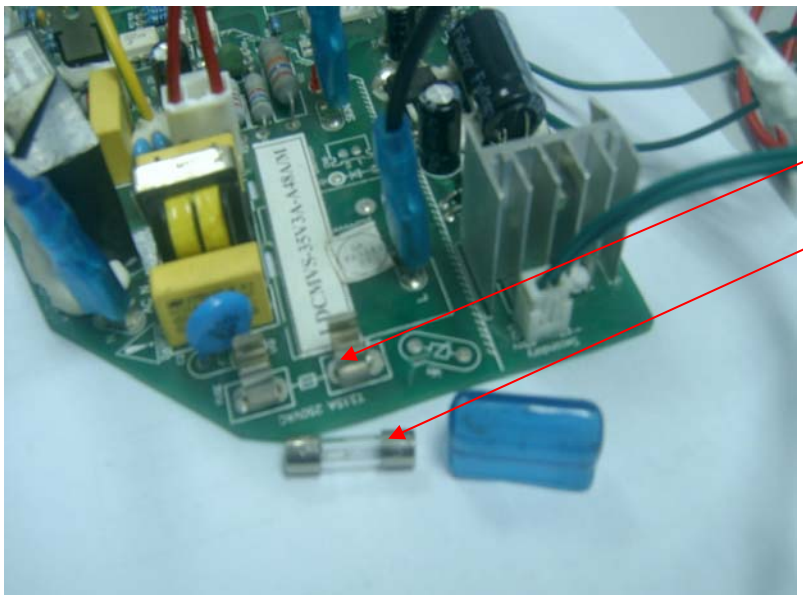


Transformer secondary is off



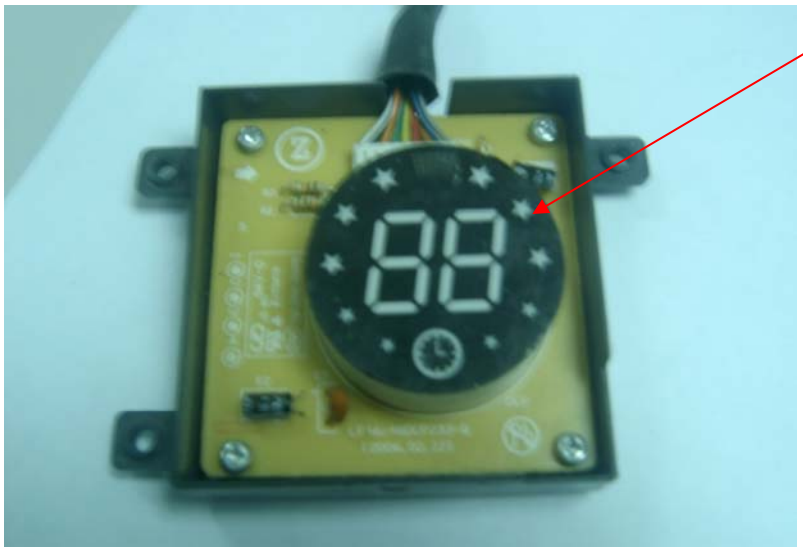
Transformer primary is off

The relevant transfomer primary socket



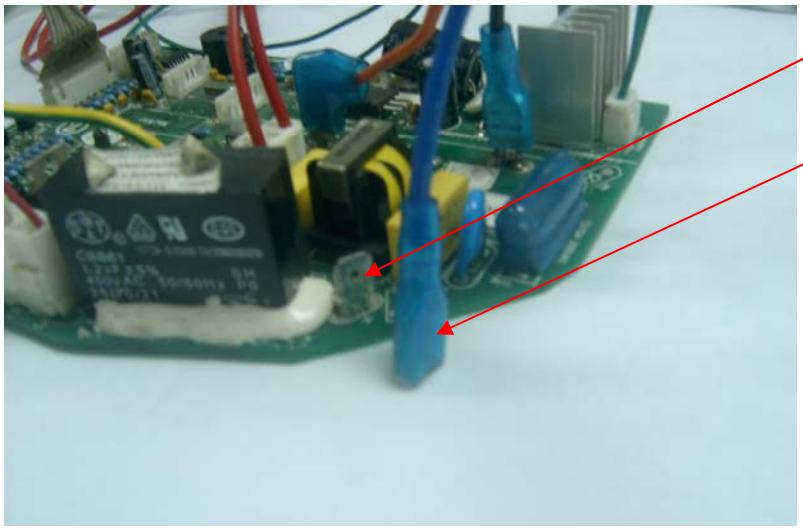
Indoor unit fuse is off.

The indoor unit fuse



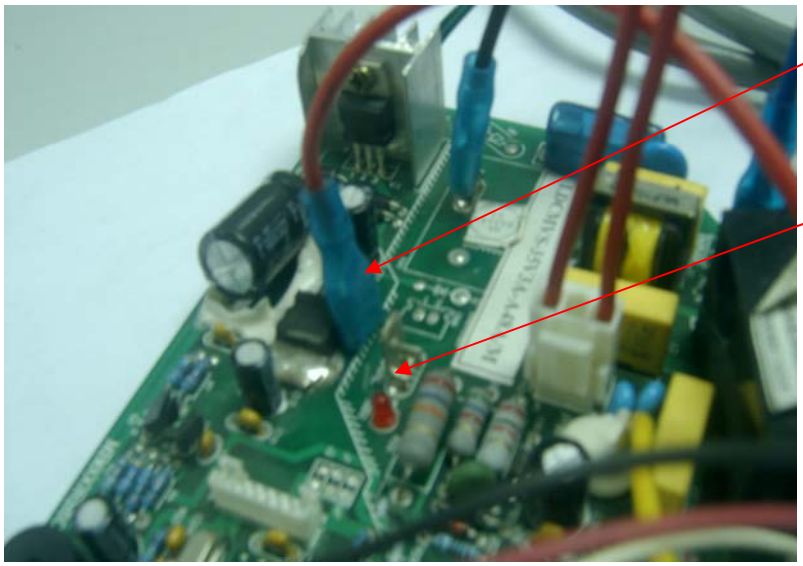
The condition that the lamp panel can't display。

3.（1）when the indoor null line is off，the system displays F1 code 。
（2）when indoor communication wire is off，the system also displays F1 code 。



The inserted slice to null line

The indoor unit null line is off。

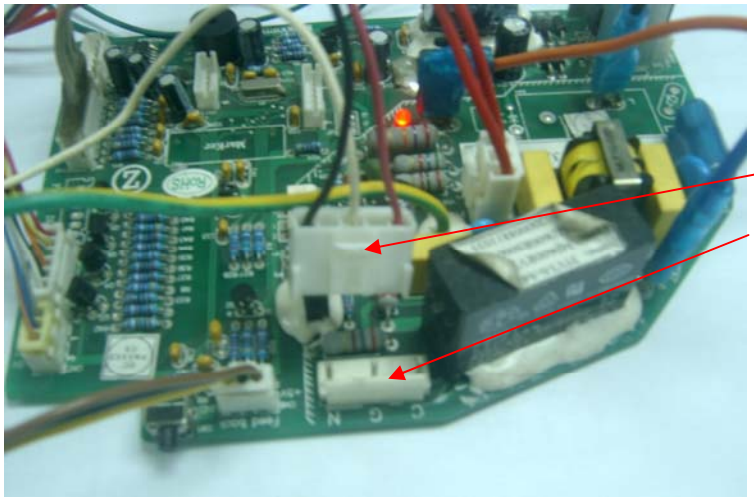


（2）the indoor communication wire is off.

Communication wire socket.

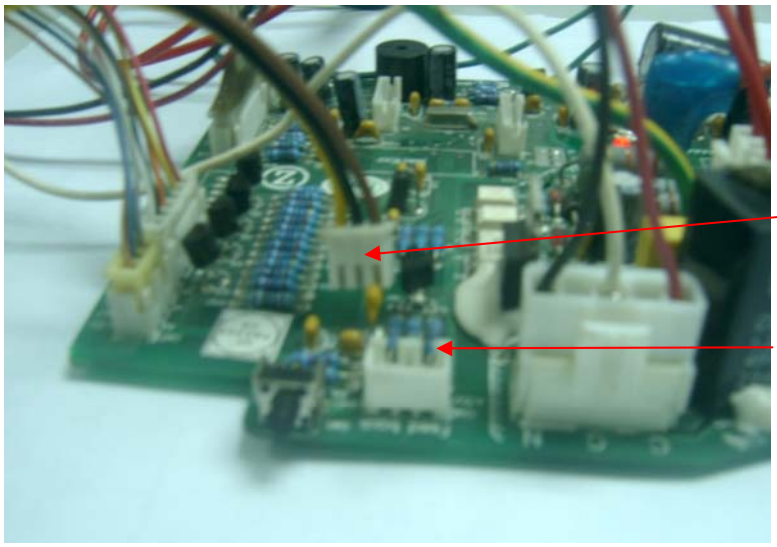
the indoor lamp panel displays F1 code.

4. when indoor fan mainline or feedback wire is off，the indoor lamp panel displays F4 code. After directly insert it well，To restart the unit to recover normal .



Indoor fan mainline is off。

The relevant socket with indoor fan mainline

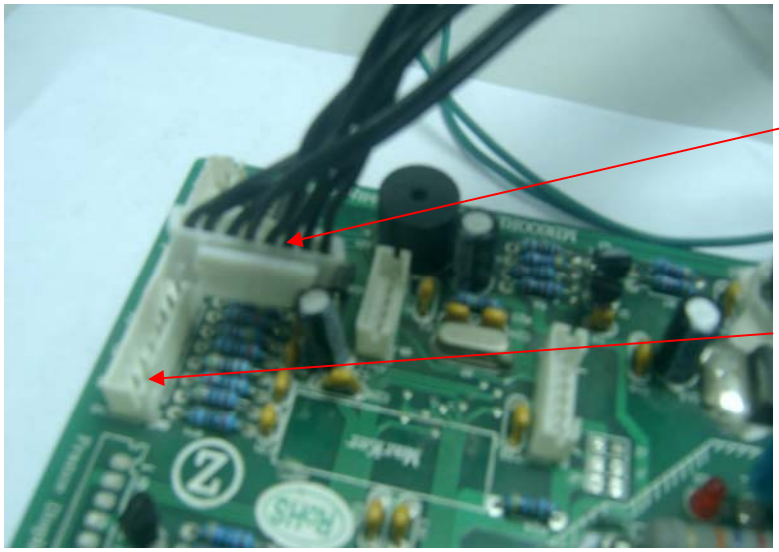


indoor fan feedback wire is off。

the relevant socket with indoor feedback wire 。

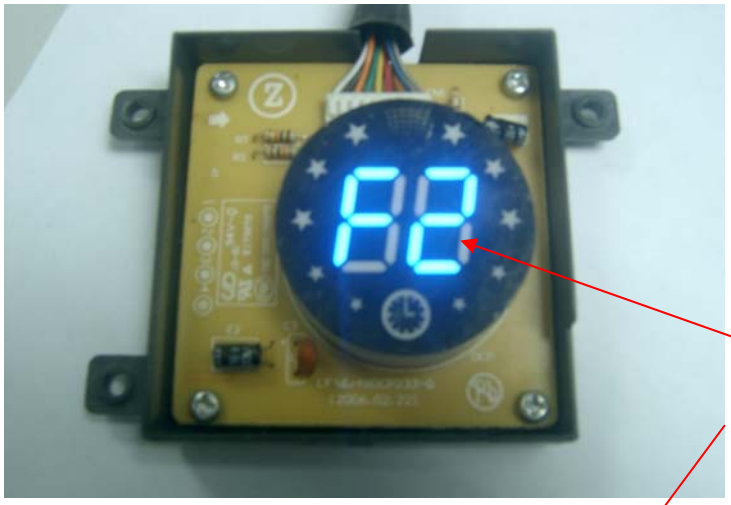
The lamp panel displays F4 code.

5.when indoor sensor has the problem, the lamp will display F_2 、 F_3 code. When indoor coil outlet , inlet and middle temperature sensor appear malfunction, the lamp panel displays F3 code; when indoor temperature sensor appears fault, the lamp panel shows F2 fault code.



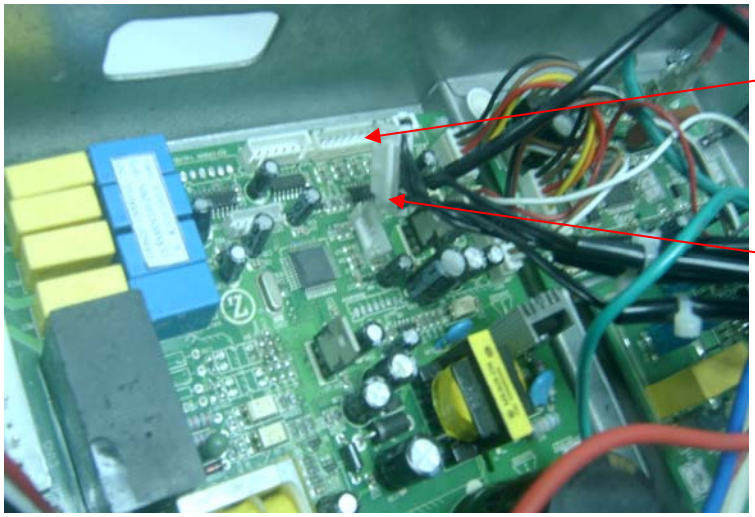
Indoor temperature sensor plug

the relevant socket of indoor temperature sensor plug



The lamp panel alternately displays F2,F3 fault code.

6.when outdoor temperature sensor is off or loose contact，the indoor lamp panel displays F6 fault code.



the relevant socket of outdoor temp. sensor.

The outdoor temperature sensor is off or loose contact.

The indoor lamp panel displays F6 fault code.

7.when the system appears mode conflict，the indoor lamp panel shows d1 code.

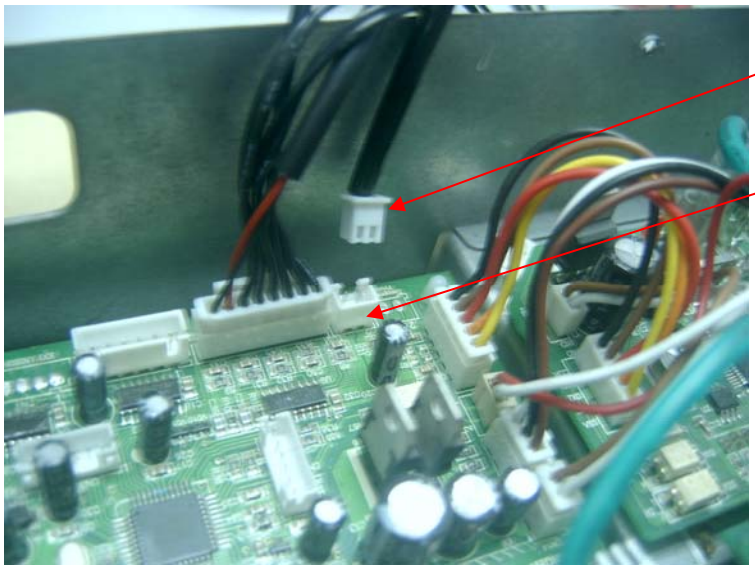
the indoor lamp panel shows **d1** code.

8.when the system is in the defrosting condition，The lamp panel displays dF code.

The lamp panel displays **dF** code.

Ⅱ． The outdoor electrical control fault code of the America 12K model .

1.the outdoor module temperature sensor is off or loose contact， the lamp panel shows F6 code.

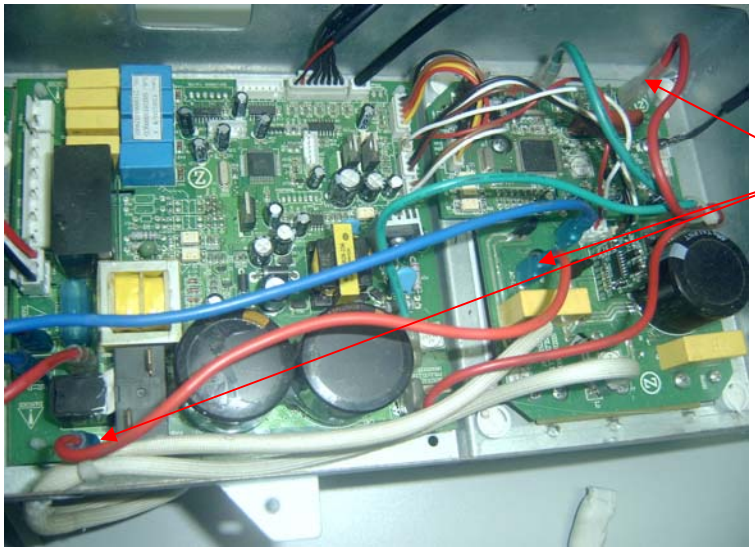


the outdoor module temperature sensor is off or loose contact .

the relevant socket with the outdoor module temperature sensor plug .

The lamp panel shows F6 code .

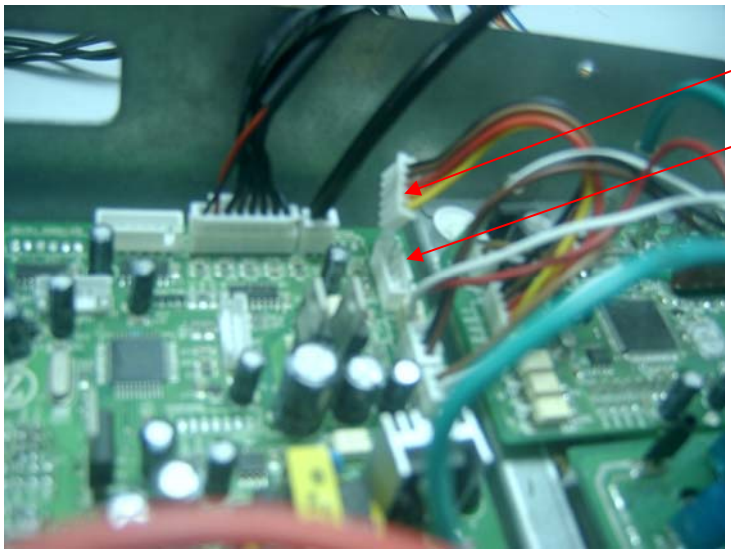
2.The outdoor unit DC busbar voltage is abnormal， the lamp panel shows F7code.



The P、N power wire are off .

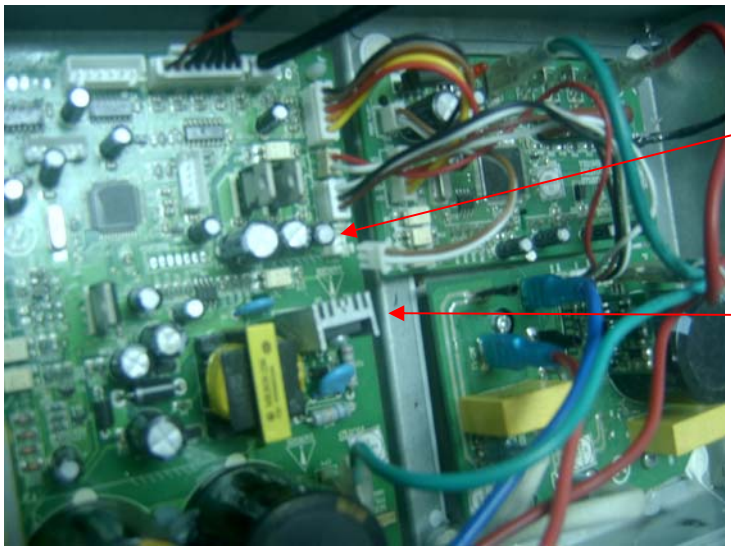
The lamp panel shows F7code.

3.the outdoor module drive wire is off ， the lamp panel shows FC code .



The outdoor module drive wire is off .

The matching socket with the outdoor module drive wire

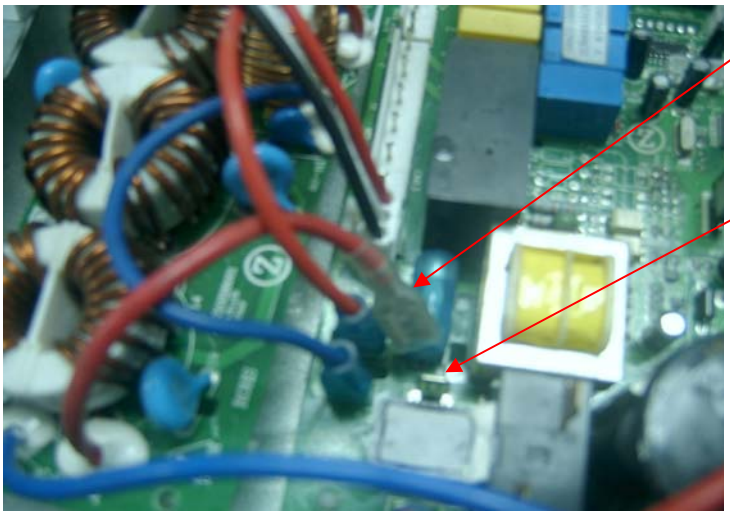


The matching socket with the outdoor module drive wire .

The outdoor module drive wire is off .

The lamp panel shows FC code .

4、the wave filtering board and mainboard power wire is off or loose contact，the lamp panel shoes F1 code .

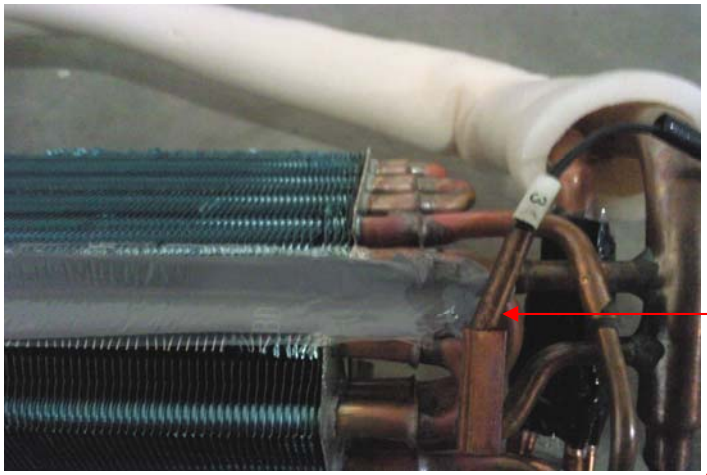


the wave filtering board and mainboard power wire is off or loose contact

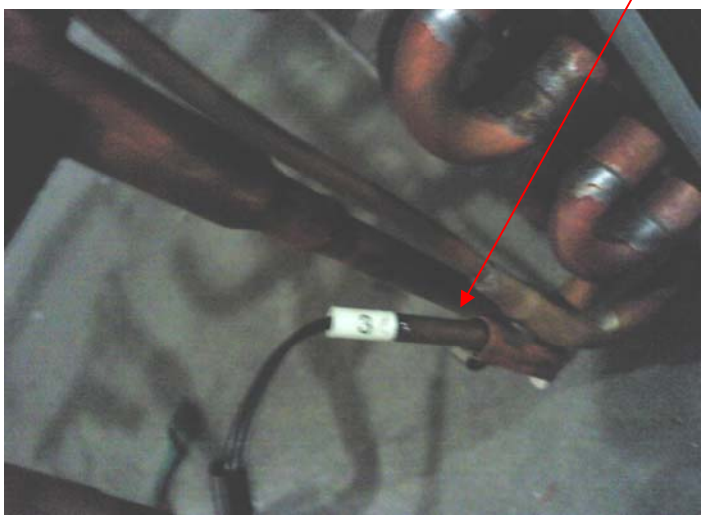
The matching socket with the wave filtering board and mainboard power wire

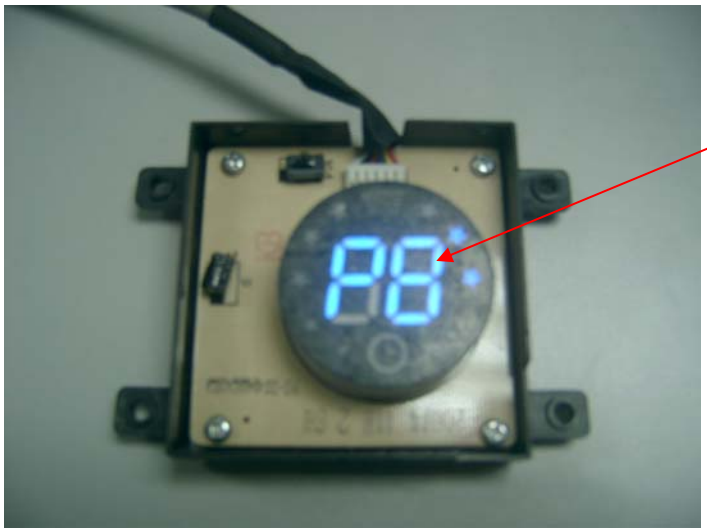
the lamp panel shoes F1 code .

5. the evaporator middle temperature and condenser middle temperature sensor is off ， the lamp panel displays P8 code .



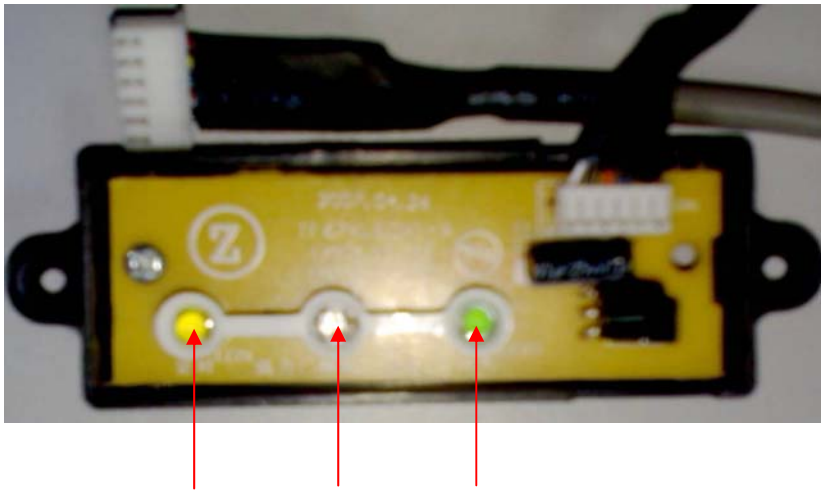
the evaporator middle temperature and condenser middle temperature sensor is off





the lamp panel displays P8 code

The 67th style indoor lamp panel



The timing lamp The turbo lamp The running lamp

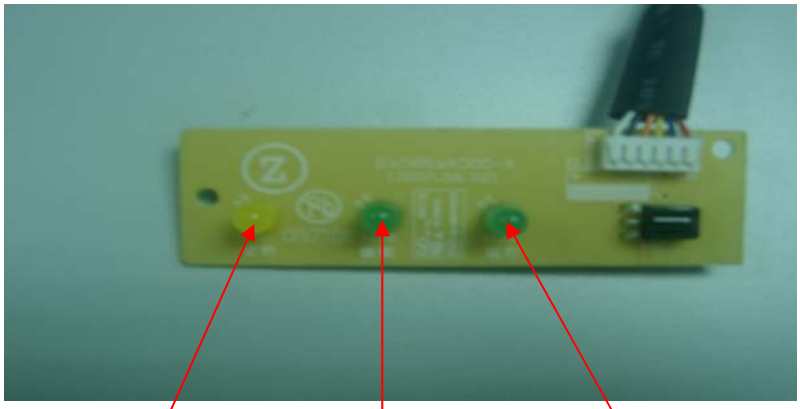
The indoor unit faulty display:

Faulty contents	Trouble display
Communication fault	The running lamp lightens all the time, the turbo lamp lightens 2 times , and then extinguish 2 seconds。
Indoor fan fault	The running lamp lightens all the time, the turbo lamp lightens 5 times, and then extinguish 2 seconds。
Indoor temp. sensor fault	The running lamp lightens all the time, the turbo lamp lightens 3 times , and then extinguish 2 seconds。
Indoor coil outlet temp. sensor fault	The running lamp lightens all the time, the turbo lamp lightens 4 times, and then extinguish 2 seconds。
Indoor coil inlet temp. sensor fault	The running lamp lightens all the time, the turbo lamp lightens 4 times , and then extinguish 2 seconds。
Indoor coil middle temp. sensor fault	The running lamp lightens all the time, the turbo lamp lightens 4 times , and then extinguish 2 seconds。
Mode conflict	The running lamp lightens 1 time , and then extinguish 1 second。
Defrosting or anti cold air	The timing lamp lightens 1 time , and then extinguish 1 second。

The outdoor unit faulty display:

Faulty contents	Trouble display
the outdoor unit transducer module protection faulty	The timing lamp lightens all the time, the turbo lamp lightens 2 times , and then extinguish 2 seconds。
over current of outdoor unit	The timing lamp lightens all the time, the turbo lamp lightens 3 times , and then extinguish 2 seconds。
discharge temp. of compressor too high, outside ambient temp. too high, switch temp. of compressor crust cut off, temp. of module too high	The timing lamp lightens all the time, the turbo lamp lightens 4 times , and then extinguish 2 seconds。
The outdoor unit DC busbar voltage is abnormal	The timing lamp lightens all the time, the turbo lamp lightens 7 times , and then extinguish 2 seconds。
lack refrigerant or reverse valve fault	The timing lamp lightens all the time, the turbo lamp lightens 8 times , and then extinguish 2 seconds。
outdoor sensor fault	The running lamp lightens all the time, the turbo lamp lightens 7 times , and then extinguish 2 seconds。
outdoor unit drive fault, start compressor failure	The running lamp lightens all the time, the turbo lamp lightens 6 times , and then extinguish 2 seconds。

The 85th style indoor lamp panel



The timing lamp **The sleeping lamp** **The running lamp**

Faulty contents	Trouble display
Communication fault	The timing lamp lightens all the time, the sleeping lamp lightens 2 times , and then extinguish 2 seconds。
Indoor fan fault	The timing lamp lightens all the time, the sleeping lamp lightens 5 times , and then extinguish 2 seconds。
Indoor temp. sensor fault	The timing lamp lightens all the time, the sleeping lamp lightens 3 times , and then extinguish 2 seconds。
Indoor coil outlet temp. sensor fault	The timing lamp lightens all the time, the sleeping lamp lightens 4 times , and then extinguish 2 seconds。
Indoor coil inlet temp. sensor fault	The timing lamp lightens all the time, the sleeping lamp lightens 4 times , and then extinguish 2 seconds。
Indoor coil middle temp. sensor fault	The timing lamp lightens all the time, the sleeping lamp lightens 4 times , and then extinguish 2 seconds。
Mode conflict	The timing lamp lightens 1 time , and then extinguish 1 second。
Defrosting or anti cold air	The running lamp lightens 1 time , and then extinguish 1 second。

Faulty contents	Trouble display
the outdoor unit transducer module protection faulty	The running lamp lightens all the time, the sleeping lamp lightens 2 times , and then extinguish 2 seconds。
over current of outdoor unit	The running lamp lightens all the time, the sleeping lamp lightens 3 times , and then extinguish 2 seconds。
discharge temp. of compressor too high, outside ambient temp. too high, switch temp. of compressor crust cut off, temp. of module too high	The running lamp lightens all the time, the sleeping lamp lightens 4 times , and then extinguish 2 seconds。
The outdoor unit DC busbar voltage is abnormal	The running lamp lightens all the time, the sleeping lamp lightens 7 times , and then extinguish 2 seconds。
lack refrigerant or reverse valve fault	The running lamp lightens all the time, the sleeping lamp lightens 8 times , and then extinguish 2 seconds。
outdoor sensor fault	The timing lamp lightens all the time, the sleeping lamp lightens 7 times , and then extinguish 2 seconds。
outdoor unit drive fault, start compressor failure	The timing lamp lightens all the time, the sleeping lamp lightens 6 times , and then extinguish 2 seconds

7、The analysis of the complete units malfunction code

1、Malfunction code：**F1** （communications issue）

The faulty cause：
1, hardware fault for PFC
2, the communication wire is broken off or connected wrongly；
3、the power ground wire isn't connected reliably；
4、the indoor PCB's hardware has been damaged；
5, the outdoor PCB's hardware has been damaged

Turn on the power

Check whether PFC of outdoor controller is normal.（Re. Fig 1，check whether the voltage between the point of P and N is about 300V）

N → hardware fault for PFC，change PFC board.

Y

Whether the communication wire is connected wrongly or disentwined.

Y →
1、 Refer to the connecting diagram (Fig 1~9)，check whether the wire is connected correctly.
2、 Please screw again to make the wire firm.

N

The indoor PCB fault，check whether the communication circuit on the indoor PCB has been damaged，check especially some important electric parts ,such as the optical coupler、voltage stabilizing diode、resistor、PTC ,and so on ;(Fig. 10)

Y → Change indoor PCB.

N

The outdoor PCB fault , check whether the communication circuit on the outdoor PCB has been damaged，check especially some important electric parts ,such as the optical coupler、voltage stabilizing diode、resistor、PTC and so on ；Please replace the PCB if being abnormal (Fig. 11)

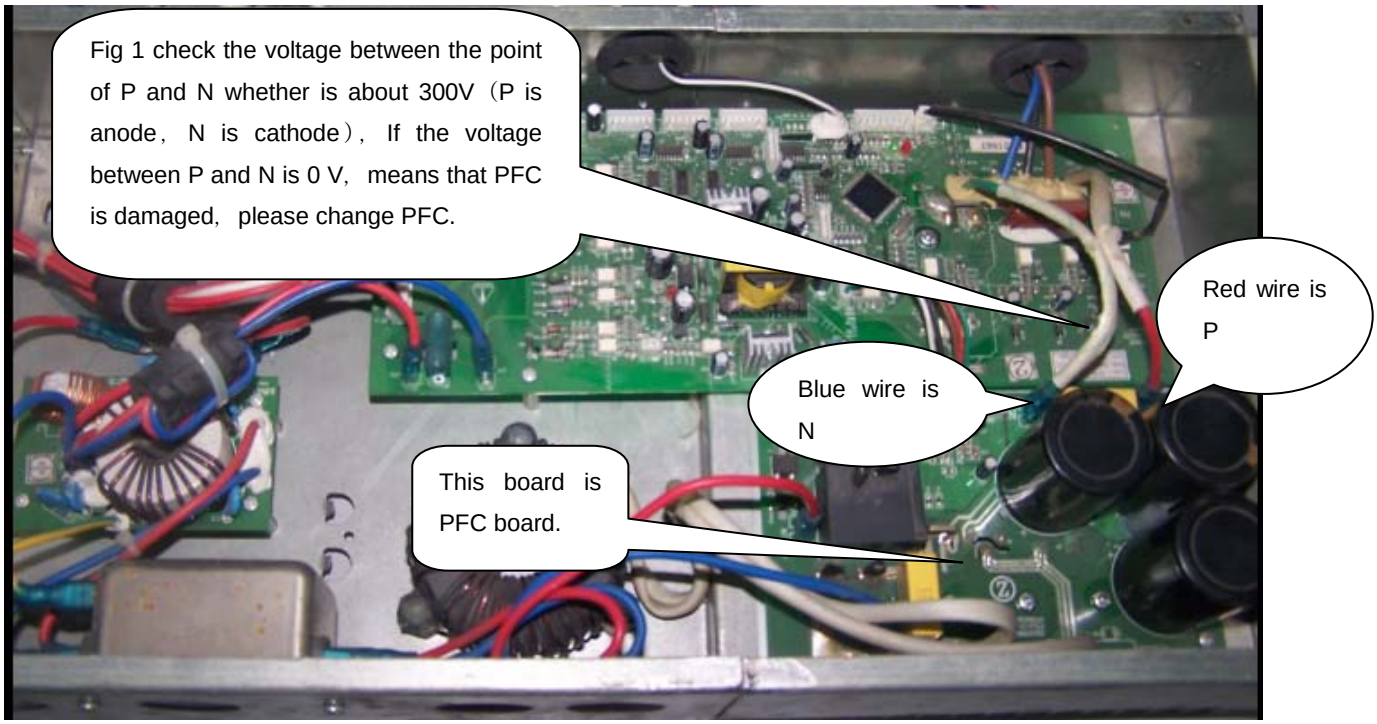
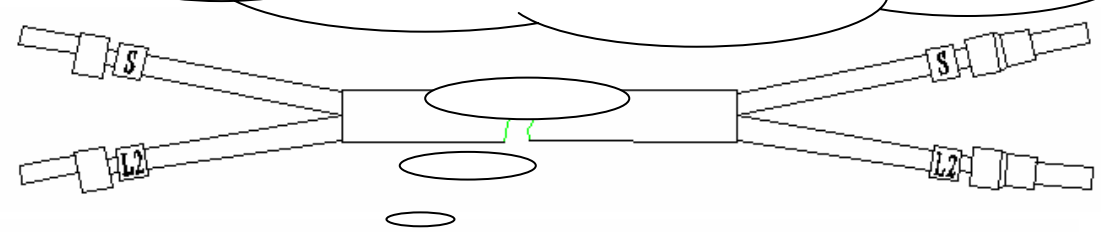


Fig 1 check the voltage between the point of P and N whether is about 300V（P is anode， N is cathode）， If the voltage between P and N is 0 V， means that PFC is damaged， please change PFC.
Red wire is P
Blue wire is N
This board is PFC board.

Note 7：there are two kinds of connecting craftwork for the indoor and outdoor connecting cable，Fig. 8 shows the craftwork before 2007，and Fig. 9 shows the craftwork after 2007.



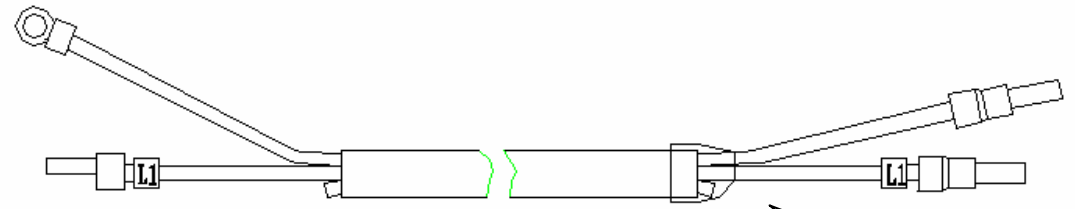


Fig. 8 the indoor and outdoor connecting cable's craftwork before 2007

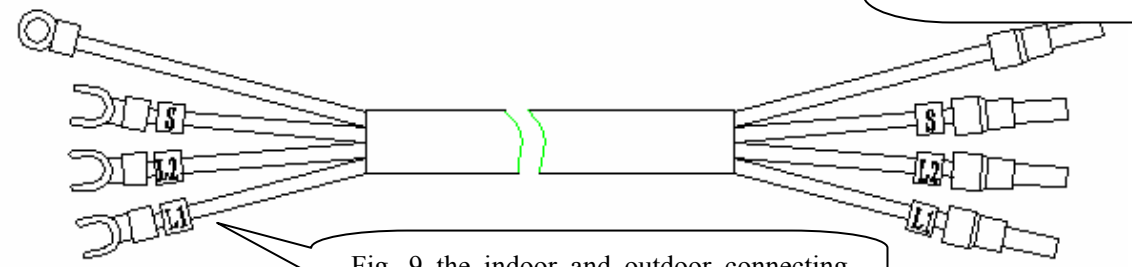


Fig. 9 the indoor and outdoor connecting cable's craftwork after 2007 。

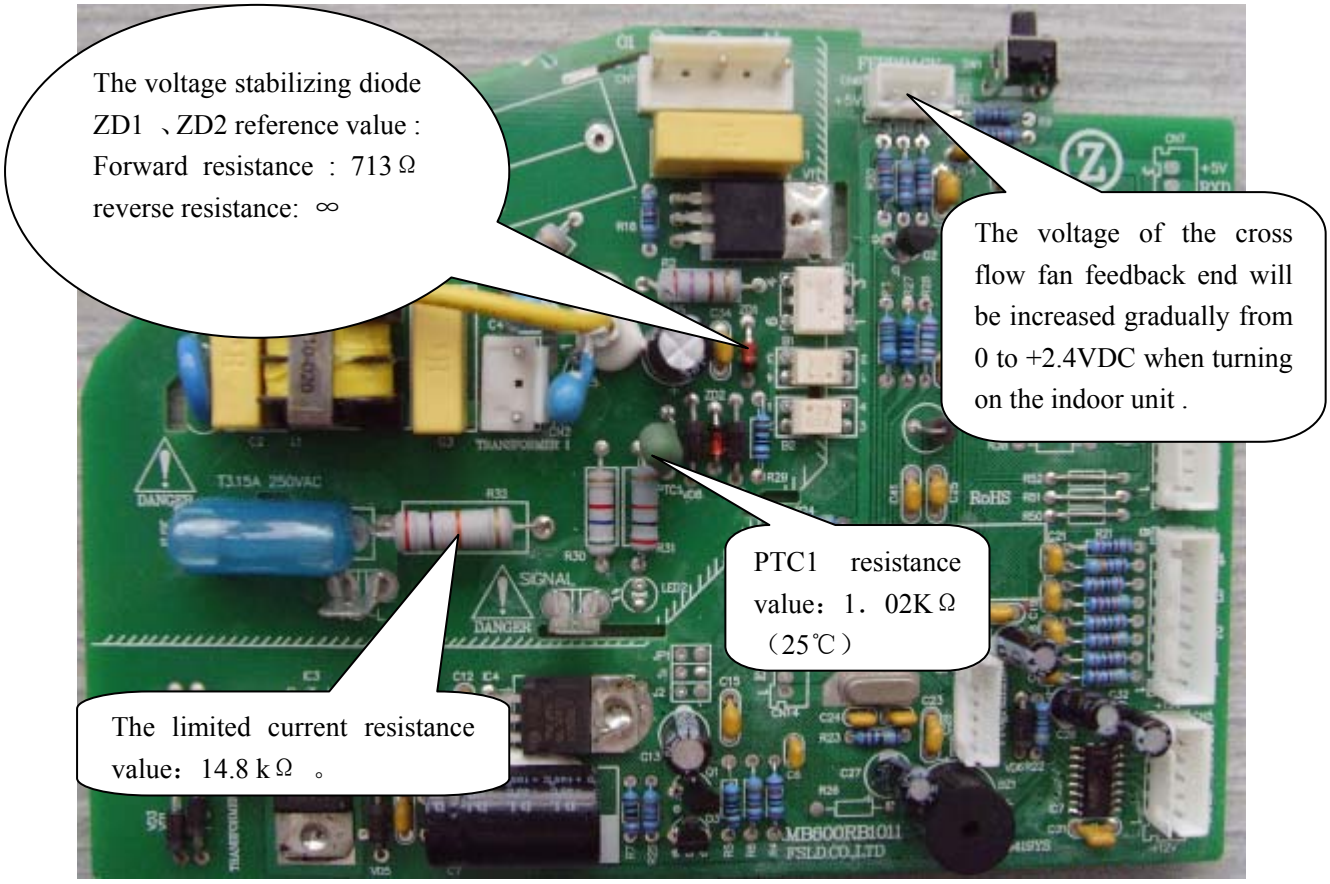

The voltage stabilizing diode ZD1 、ZD2 reference value : Forward resistance : 713Ω reverse resistance: ∞
The voltage of the cross flow fan feedback end will be increased gradually from 0 to +2.4VDC when turning on the indoor unit .
PTC1 resistance value：1．02KΩ （25℃）
The limited current resistance value：14.8 kΩ 。

Fig. 10: the indoor PCB Note：the above parameter is tested when there is the power in the PCB, so is the following 。

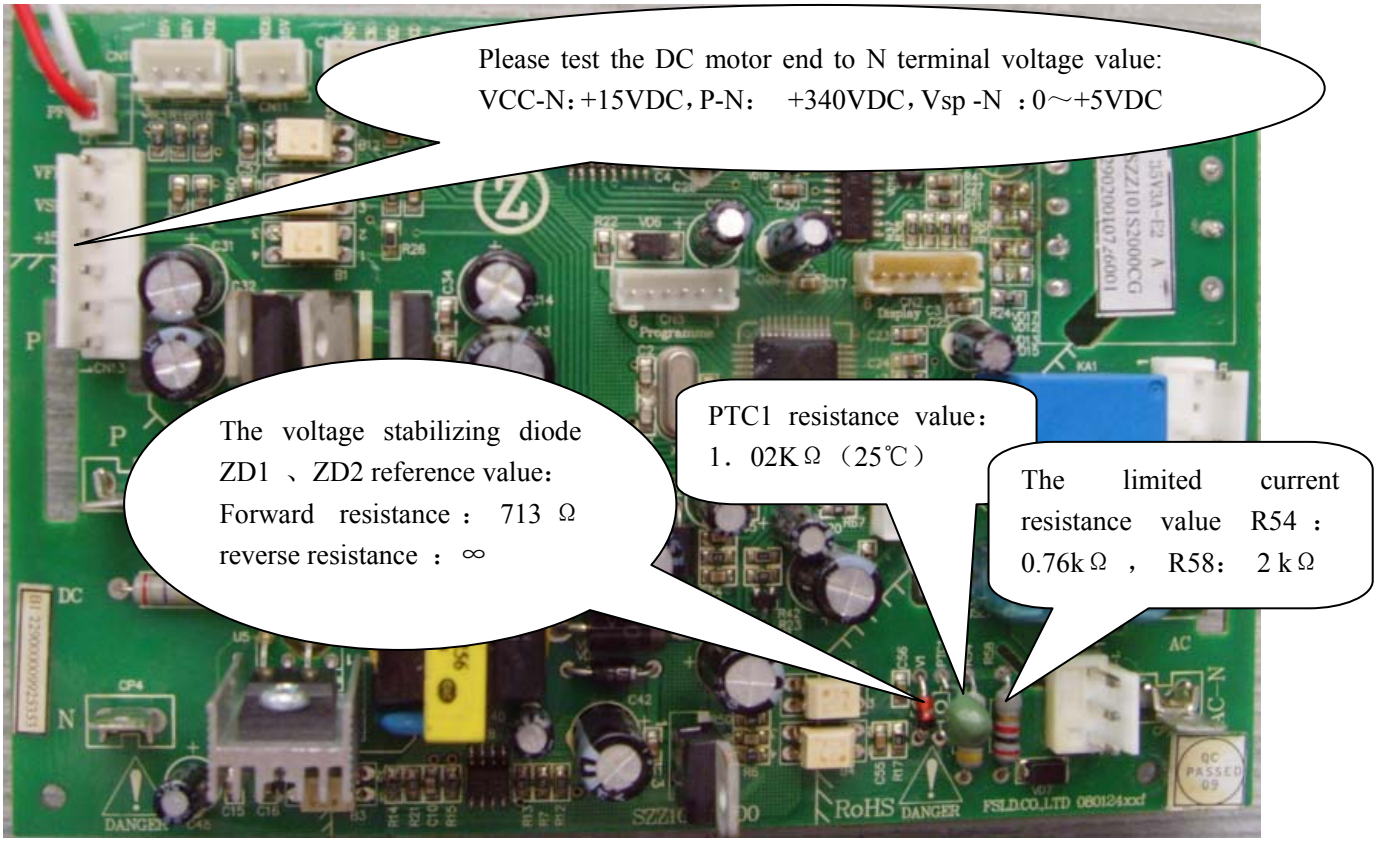

Please test the DC motor end to N terminal voltage value:
VCC-N：+15VDC，P-N： +340VDC，Vsp -N ：0～+5VDC
The voltage stabilizing diode ZD1 、ZD2 reference value：
Forward resistance ： 713 Ω
reverse resistance ： ∞
PTC1 resistance value：
1．02KΩ（25℃）
The limited current resistance value R54 ：0.76kΩ ， R58： 2 kΩ

Fig. 11：the outdoor PCB

2，Malfunction code：F2 （the indoor temp sensor fault）

Faulty cause：1、maybe the indoor temp sensor's bnc connector plugs is loose or contact ill;
2、the sensor is bad or the down-lead is circuit-break、circuit－short
3、the indoor PCB's hardware has been damaged

Turn off the power

Take out the temperature sensor from the indoor PCB, then check whether the indoor temperature sensor's resistance is normal.(the range of normal resistance :1~40 KΩ)

N → Please replace it .when the indoor temperature sensor has problem.

Y

Connect the sensor renewedly to the indoor PCB,, then check the resistance between the sensor and indoor PCB terminal. The normal resistance value is 0Ω

N → The indoor temperature sensor adapter connector breaks off, please replace the indoor PCB or restore the adapter connector.。

Y

The indoor PCB is bad，please change it

3，Malfunction code ：F3 （the indoor coil temp sensor fault）

Faulty cause：1、maybe the indoor coil temp sensor's bnc connector plugs is loose or contact ill;
2 、 the sensor is bad or the down-lead is circuit-break、circuit －short
3、the indoor PCB's hardware has been damaged

Shut off the power

Take out the temperature sensor from the indoor PCB, Then check whether the indoor coil temperature sensor's resistance is normal. (the range of normal resistance :1~40 KΩ)

N → Replace it .when the indoor coil temperature sensor has problem.

Y

Connect the sensor with the indoor PCB again. Check the sensor and the indoor PCB terminal resistance. The normal value is 0Ω

N → If the indoor coil temperature sensor adapter connector is loose. Change this indoor PCB or repair this adapter connector

Y

The indoor PCB is bad. Please change it.

4，Malfunction code：F4 （the indoor fan motor fault）

The faulty cause：
1、the fan motor is blocked or turns abnormally；
2、the motor wire is loose or contacts ill
3、the indoor fan motor has been damaged
4、the indoor PCB is bad

Shut off the power

Check the indoor fan whether it is smooth

N

1. If the fan is bad and change it
2. The bolt what fix the indoor fan is loose. Please screw it again
3. There are any dirt in the indoor fan. Please clean it 。

Y

Take out the plug from the indoor PCB. Then test the every winding resistance (the normal value: the main winding is 273Ω. the auxiliary winding is 343Ω) Fig.12

N

The indoor fan motor is bad，then please change it

Y

connect the motor plug with the indoor PCB again and turn on. Then test the feedback terminal to ground wire voltage whether it is normal (the normal voltage is increased gradually from 0 to +2.4VDC) Fig.10

N

The indoor fan motor is bad，then please change it。

Y

The indoor PCB is bad. Please change it

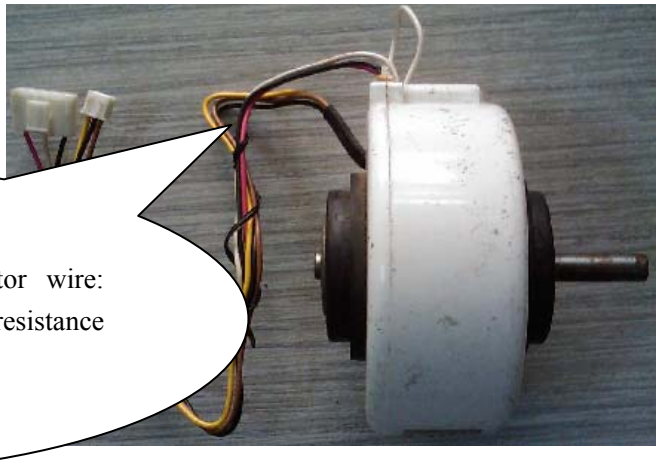


Fig. 12、the indoor fan motor
The main winding resistance（the motor wire: black-white 273Ω） the auxiliary winding resistance （the motor wire: red-white 343Ω）

5,Malfunction code：F6 （the outdoor temp sensor fault）

Faulty cause：1、maybe the indoor coil temp sensor's BNC connector plugs is loose or contact ill;
2、the sensor is bad or the down-lead is circuit-break、circuit－short
3、the indoor PCB's hardware has been damaged

Turn off the power

Take out the temperature sensor from outdoor PCB. Then test this outdoor temperature sensor resistance whether ii is normal (the normal: discharge sensor is 3K~200K the other sensor is 1K~40K).

N → The outdoor temp sensor is bad, Please change it.

Y

Connect the sensor with the indoor PCB again. Check the sensor and the indoor PCB terminal resistance. The normal value is 0Ω

N → The indoor temperature sensor adapter connector is loose. Change this indoor PCB or repair this adapter connector

Y

The indoor PCB is bad. Please change it

6,Malfunction code ： FA （the communication fault between the wire controller to the indoor PCB）

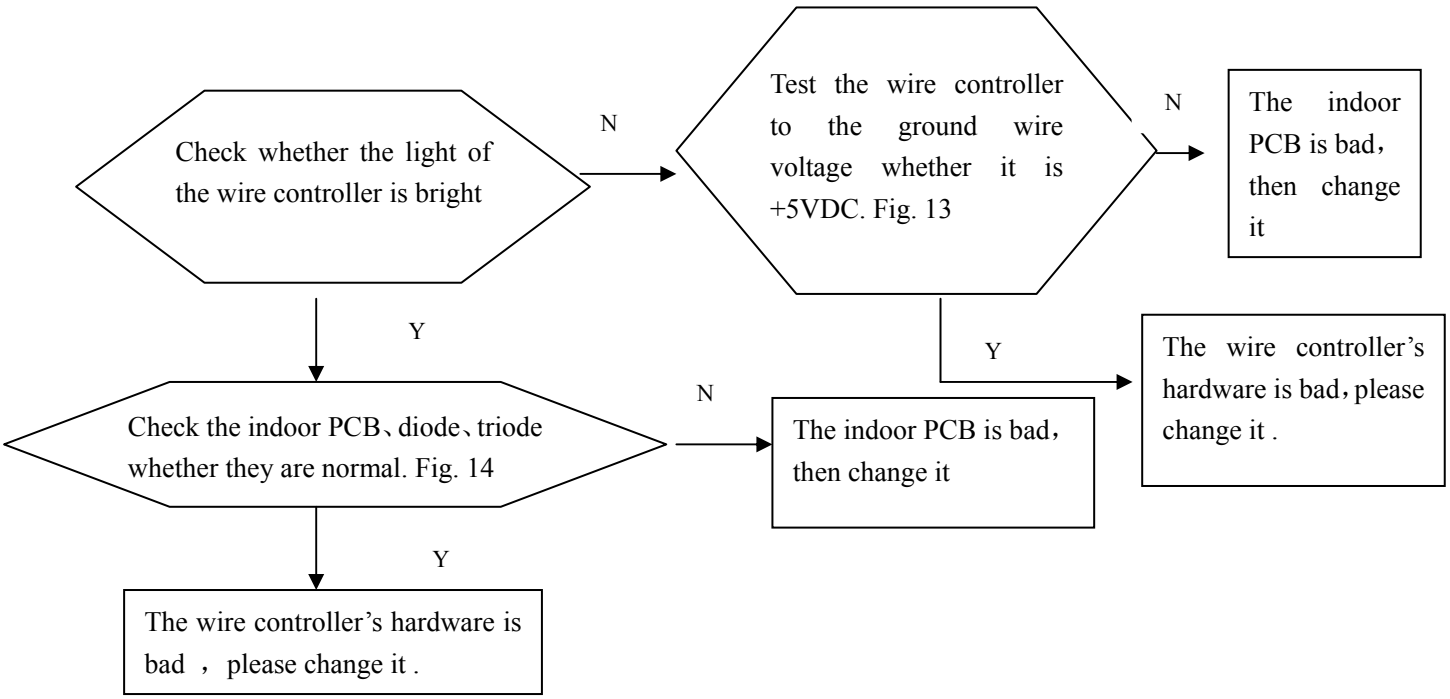
The faulty cause：
1、the wire controller's connecting plug is loose or contacts ill
2、the wire controller's hardware has been damaged ;
3、the indoor PCB has been damaged.

Electrify and turn on the unit

Check the connecting line、wire controller、PCB whether they are loose or have a bad contact.

Y → Please change the connecting line or repair the loose terminal

N


Check whether the light of the wire controller is bright
N
Test the wire controller to the ground wire voltage whether it is +5VDC. Fig. 13
N
The indoor PCB is bad, then change it
Y
Y
The wire controller's hardware is bad, please change it .
Check the indoor PCB、diode、triode whether they are normal. Fig. 14
N
The indoor PCB is bad, then change it
Y
The wire controller's hardware is bad , please change it .

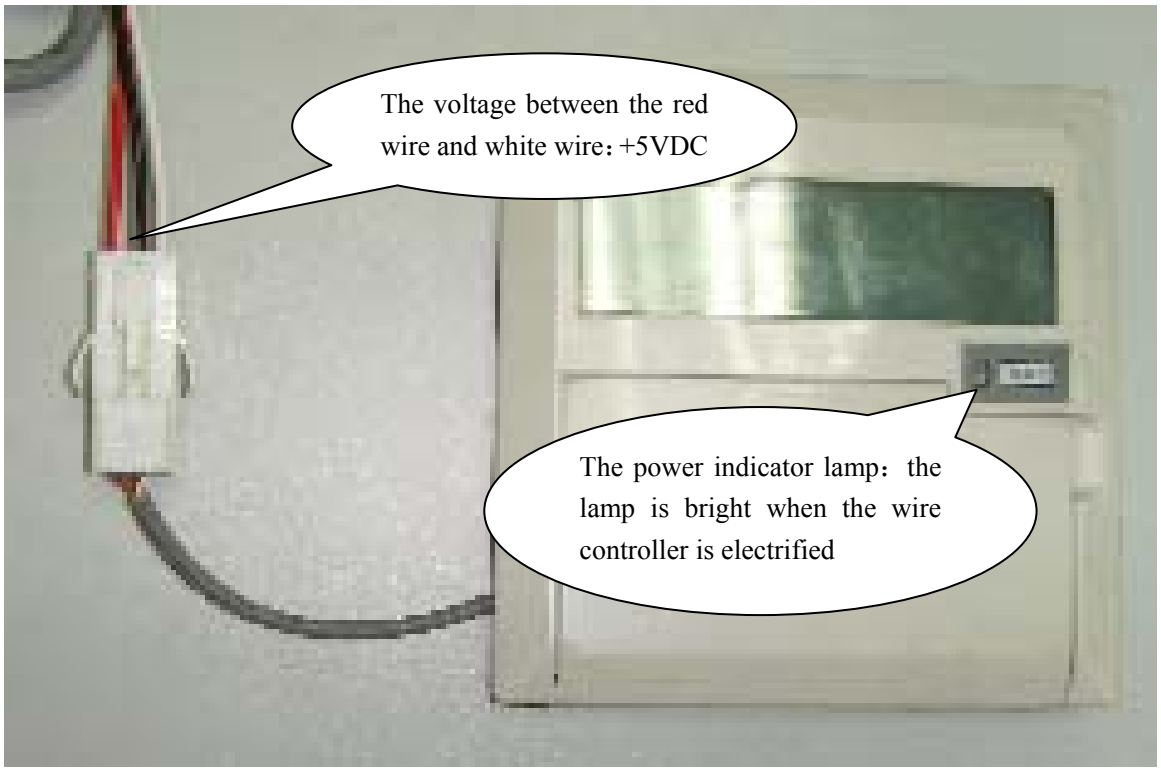
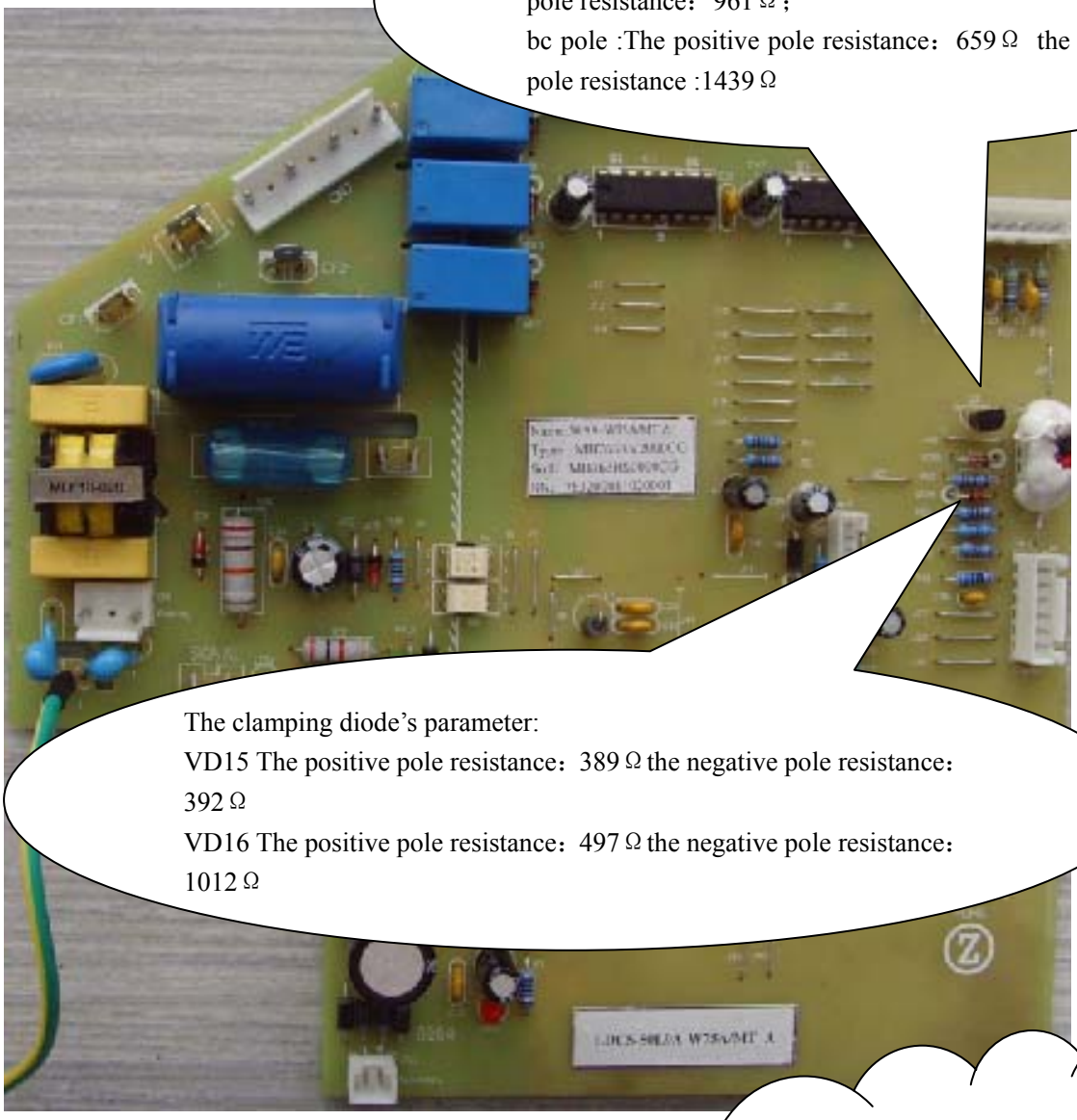

The voltage between the red wire and white wire: +5VDC
The power indicator lamp: the lamp is bright when the wire controller is electrified

Fig. 13 the wire controller

The dynatron Q3 reference value:
be pole :The positive pole resistance：660Ω the negative pole resistance：961Ω；
bc pole :The positive pole resistance：659Ω the negative pole resistance :1439Ω



The clamping diode’s parameter:
VD15 The positive pole resistance：389Ω the negative pole resistance：392Ω
VD16 The positive pole resistance：497Ω the negative pole resistance：1012Ω

Fig.14 the indoor PCB

7,Malfunction code：

P2 （the outdoor unit transducer module protection faulty）

The faulty cause：
1、the compressor’s connecting wiring is loose;
2、the IPM module and radiator are not firm
3、the IPM board has the fault.
4、PFC board hardware issue
5，the compressor is bad.

Turn off the power

1、whether the compressor’s connecting wiring is loose
2、check whether the module and radiator are firm;

N

1、please make the compressor’s connecting wiring firm。
2、please fixup the IPM and radiator together

Y

Check whether the compressor's winding value is normal （ refer to SNYO C-6RZ146H1A winding value: T-R 0.452Ω T-S0.452Ω R-S0.452Ω）

N → The compressor is bad，then change it.

Y

Change IPM board, check whether it is normal

Y → The IPM board is bad, change it.

N

Change PFC board 。

The faulty cause：
1、the ambient temp exceed the temp range of the A/C's running
2、the outdoor PCB's hardware is bad
3, disconnecting valve of outdoor is close.
4, outdoor motor can't run.

8、 The malfunction code:
P3 (The indoor input current is large)

Turn on the unit

Check the ambient temperature whether it is more than the running temperature(cooling:10~46℃, hot:-15~24℃)

Y → Please wait the conditions returned to normal then run it if the operating conditions is very bad.。

Y

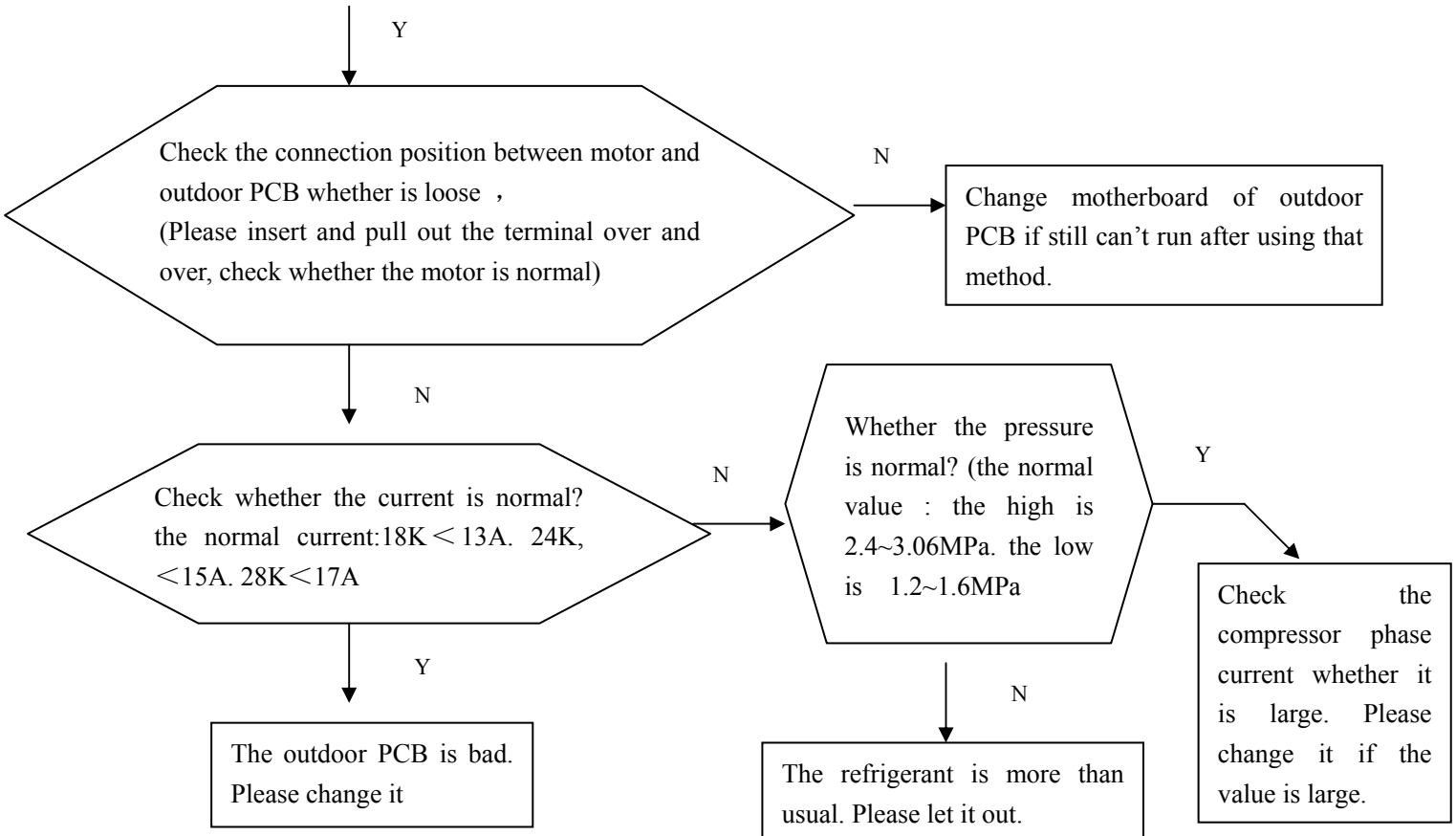
Check whether shutoff valve of outdoor is open.

N → Open the shutoff valve

Y

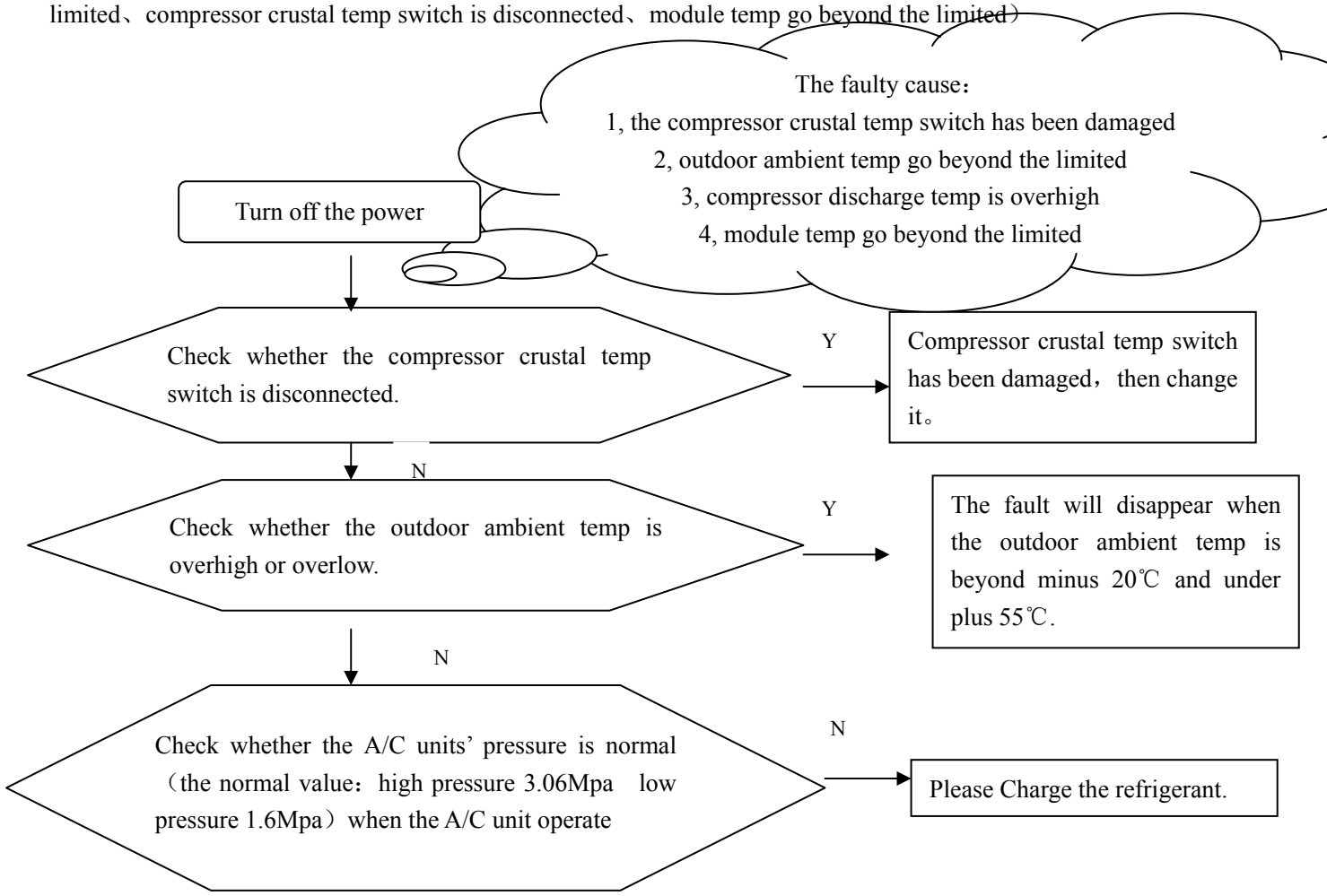
Outdoor motor can't run. Check whether the winding of motor is normal or not. (main windings is about 100Ω, the aux winding is about 200Ω)

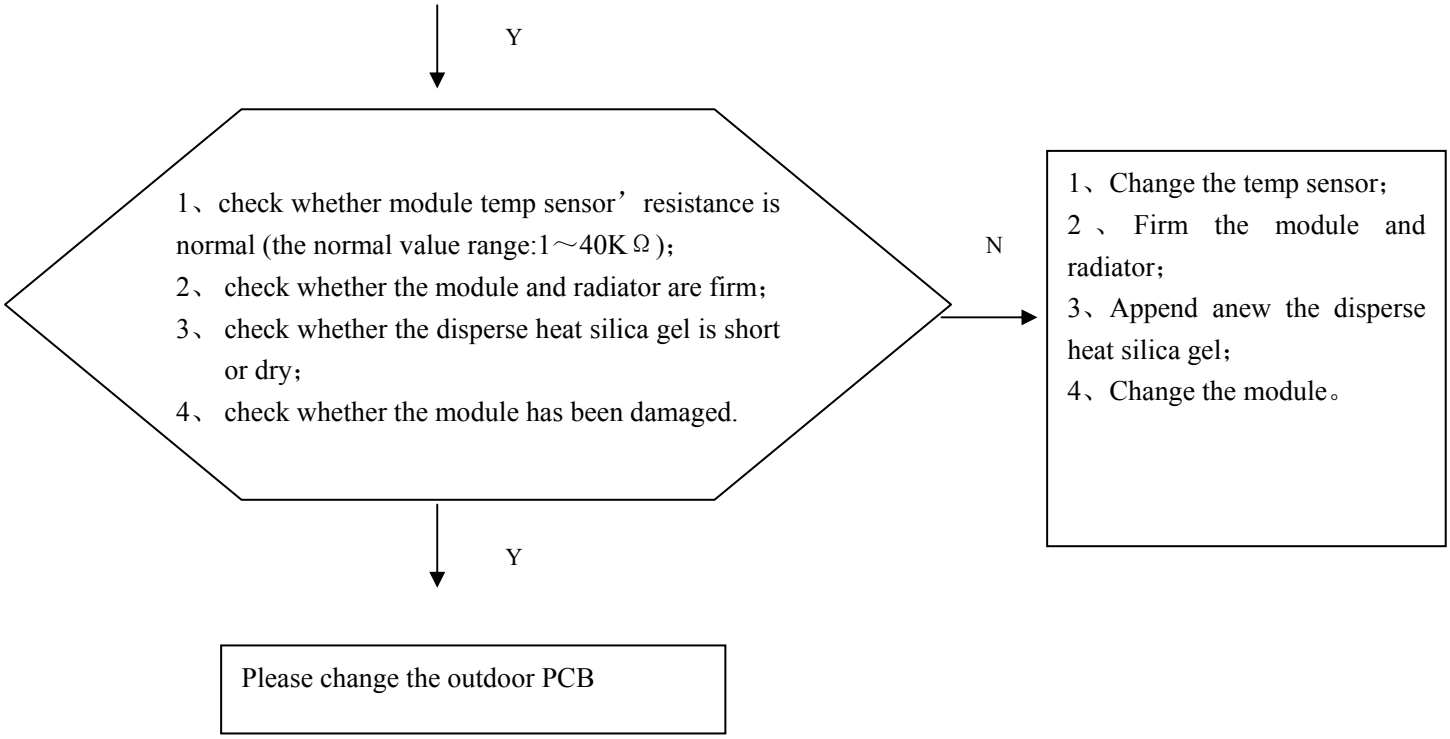
N → Motor damages. Change motor.


Y
Check the connection position between motor and outdoor PCB whether is loose ，
(Please insert and pull out the terminal over and over, check whether the motor is normal)
N
Change motherboard of outdoor PCB if still can't run after using that method.
N
Check whether the current is normal? the normal current:18K＜13A. 24K,＜15A. 28K＜17A
N
Whether the pressure is normal? (the normal value : the high is 2.4~3.06MPa. the low is 1.2~1.6MPa
Y
Check the compressor phase current whether it is large. Please change it if the value is large.
Y
The outdoor PCB is bad. Please change it
N
The refrigerant is more than usual. Please let it out.

Annotation 1：The normal value of the phase current：18K＜11A;24K＜13A;28K＜15A

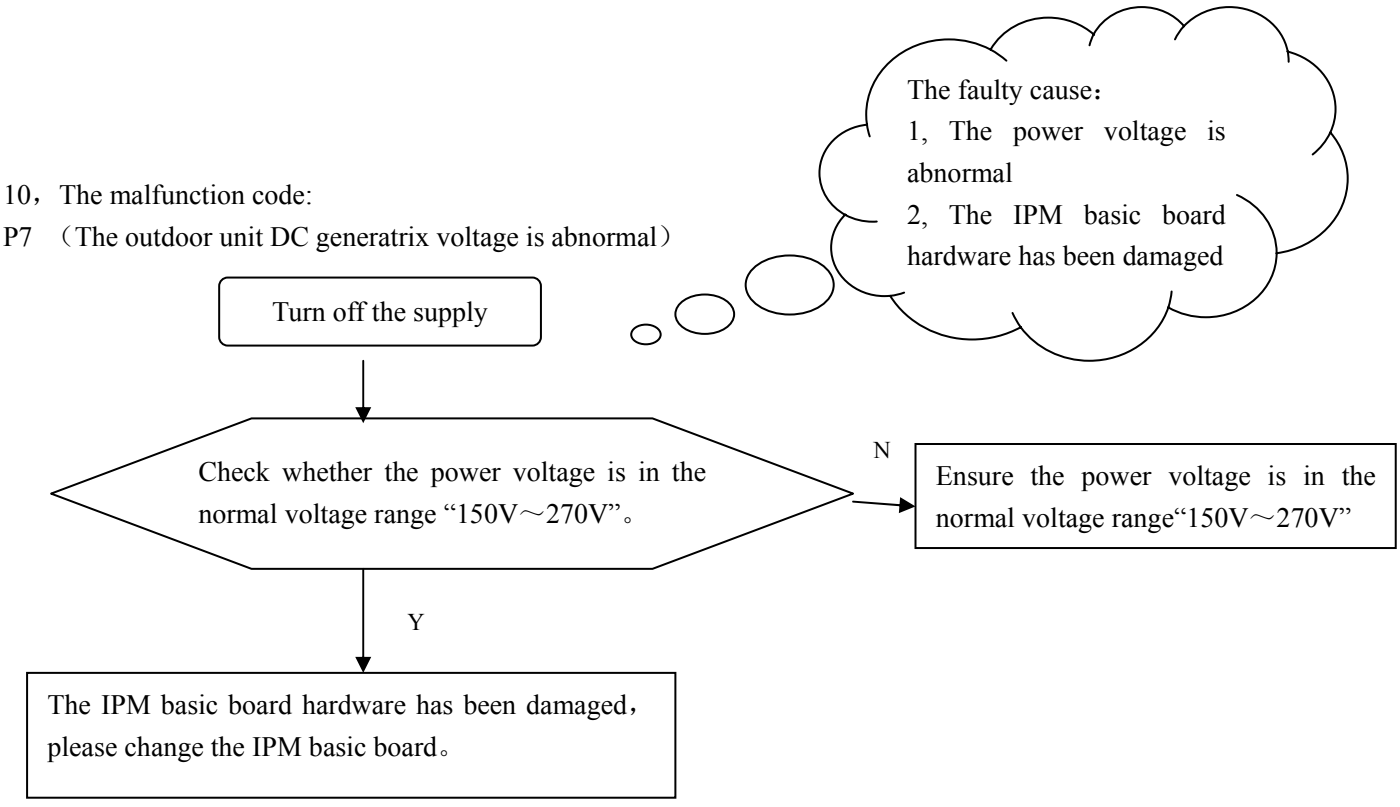
9, The malfunction code:P4 （compressor discharge temp is overhigh、outdoor ambient temp go beyond the limited、compressor crustal temp switch is disconnected、module temp go beyond the limited）


The faulty cause：
1, the compressor crustal temp switch has been damaged
2, outdoor ambient temp go beyond the limited
3, compressor discharge temp is overhigh
4, module temp go beyond the limited
Turn off the power
Check whether the compressor crustal temp switch is disconnected.
Y
Compressor crustal temp switch has been damaged，then change it。
N
Check whether the outdoor ambient temp is overhigh or overlow.
Y
The fault will disappear when the outdoor ambient temp is beyond minus 20℃ and under plus 55℃.
N
Check whether the A/C units' pressure is normal （the normal value：high pressure 3.06Mpa low pressure 1.6Mpa）when the A/C unit operate
N
Please Charge the refrigerant.


Y
1、check whether module temp sensor’ resistance is normal (the normal value range:1～40KΩ)；
2、 check whether the module and radiator are firm；
3、 check whether the disperse heat silica gel is short or dry；
4、 check whether the module has been damaged.
N
1、Change the temp sensor；
2 、 Firm the module and radiator；
3、Append anew the disperse heat silica gel；
4、Change the module。
Y
Please change the outdoor PCB

10，The malfunction code:

P7 （The outdoor unit DC generatrix voltage is abnormal）


The faulty cause：
1, The power voltage is abnormal
2, The IPM basic board hardware has been damaged
Turn off the supply
Check whether the power voltage is in the normal voltage range “150V～270V”。
N
Ensure the power voltage is in the normal voltage range“150V～270V”
Y
The IPM basic board hardware has been damaged，please change the IPM basic board。

11、The malfunction code：

P8 （lack the refrigerant or reverse valve fault）

The faulty cause

1、 the high and low pressure valve are closed

2、 the refrigerant leaks from the A/C system

3、 the indoor and outdoor pipe temp sensor are loose or hang in the air.

4、 the indoor and outdoor pipe temp sensor has been damaged.

Turn off the power

Check whether the high and low pressure valves are open

N

Open the high and low pressure valve

Y

Check whether the system pressure is normal（the normal value ： high pressure3.06Mpa low pressure1.6Mpa）

N

Due to refrigerant leakage，kook for the leak to weld it，then charge anew the refrigerant to the system.Fig.9～17

Y

Check whether the indoor and outdoor pipe temp sensor are loose or hang in the air.

Y

Please arrange the indoor and outdoor sensor correctly and change it if the probe spring piece is damaged.

N

Please change it if the sensor wire is short circuit or open circuit.

Fig. 15、 please make sure that there is enough soap bubble.

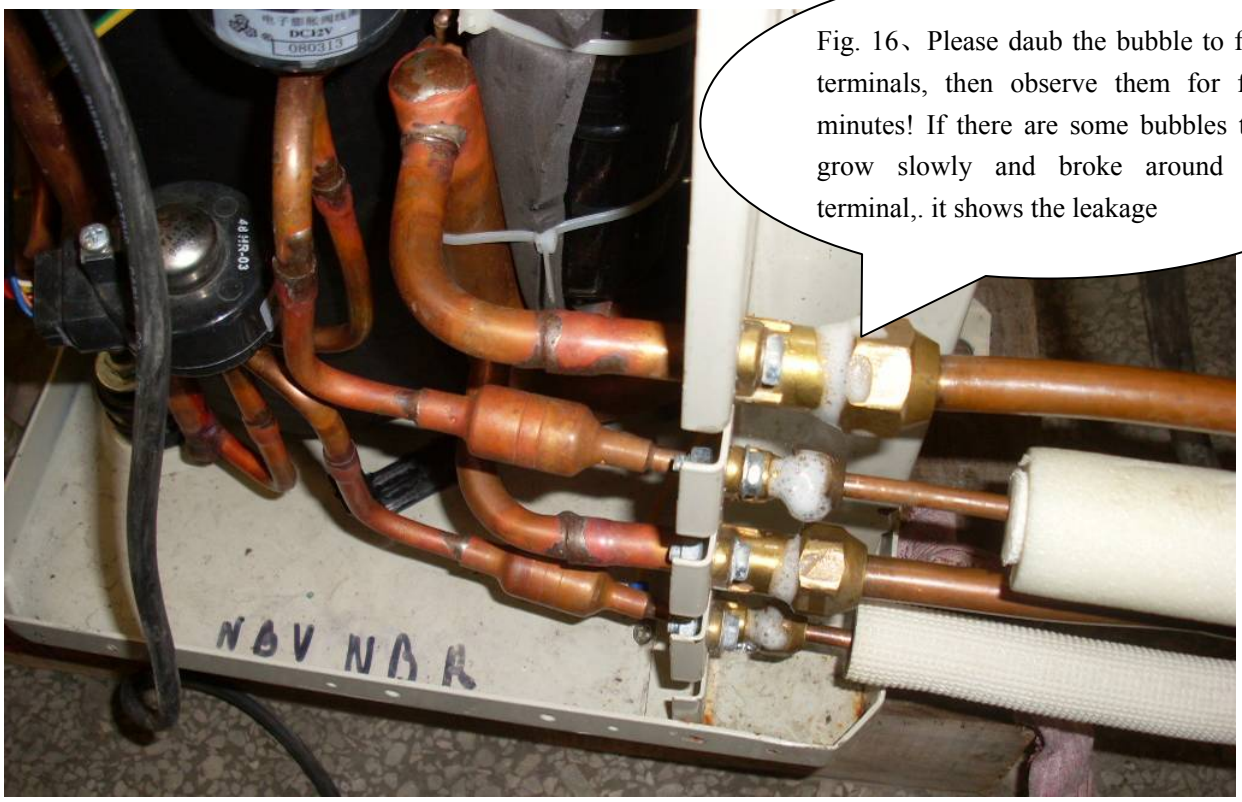


Fig. 16、Please daub the bubble to four terminals, then observe them for five minutes! If there are some bubbles that grow slowly and broke around the terminal,. it shows the leakage

Warning： please connecting the indoor and outdoor units according to the correct installing method，Fig. 17~21 show the right operating way;（Note：the indicator figures aren't the real photos about the DC inverter dual zone unit）

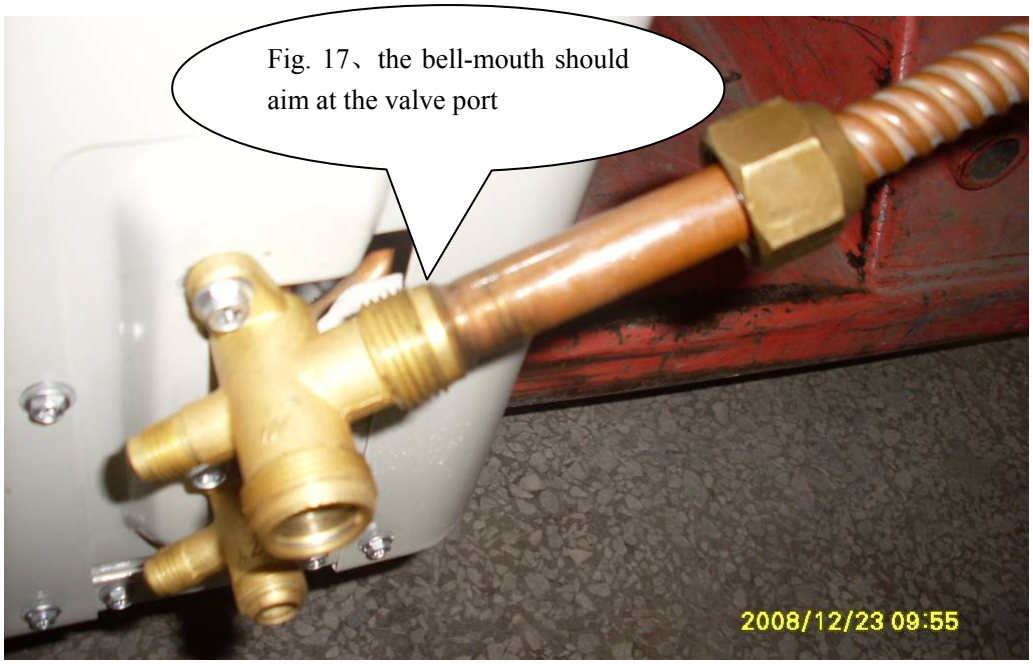


Fig. 17、the bell-mouth should aim at the valve port
2008/12/23 09:55

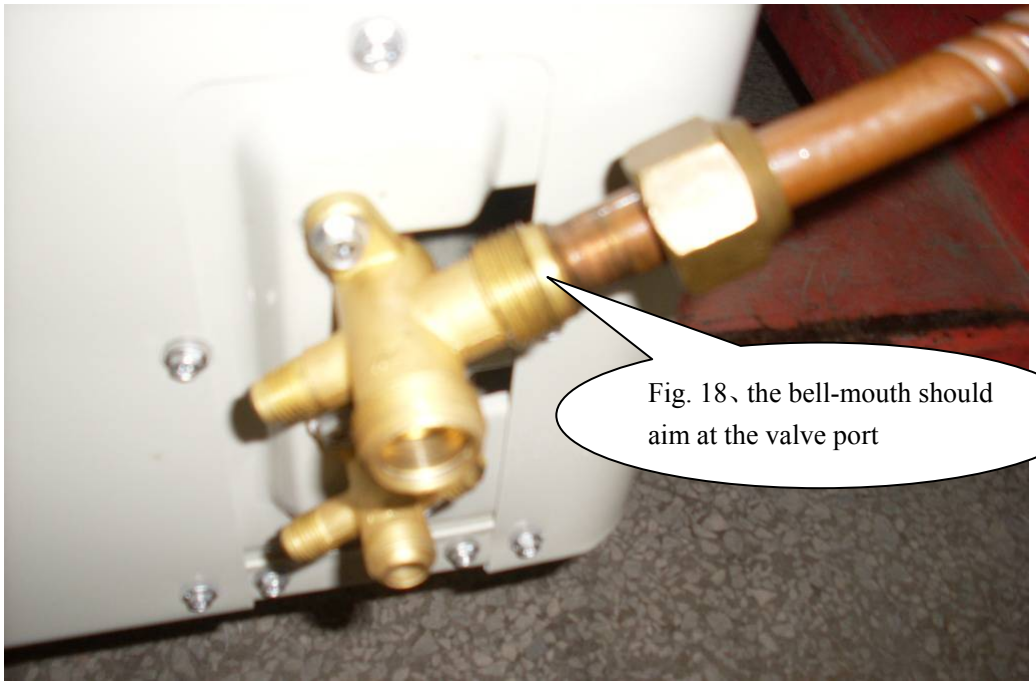


Fig. 18、the bell-mouth should aim at the valve port

Fig. 19、screw down the nut gradually by hand

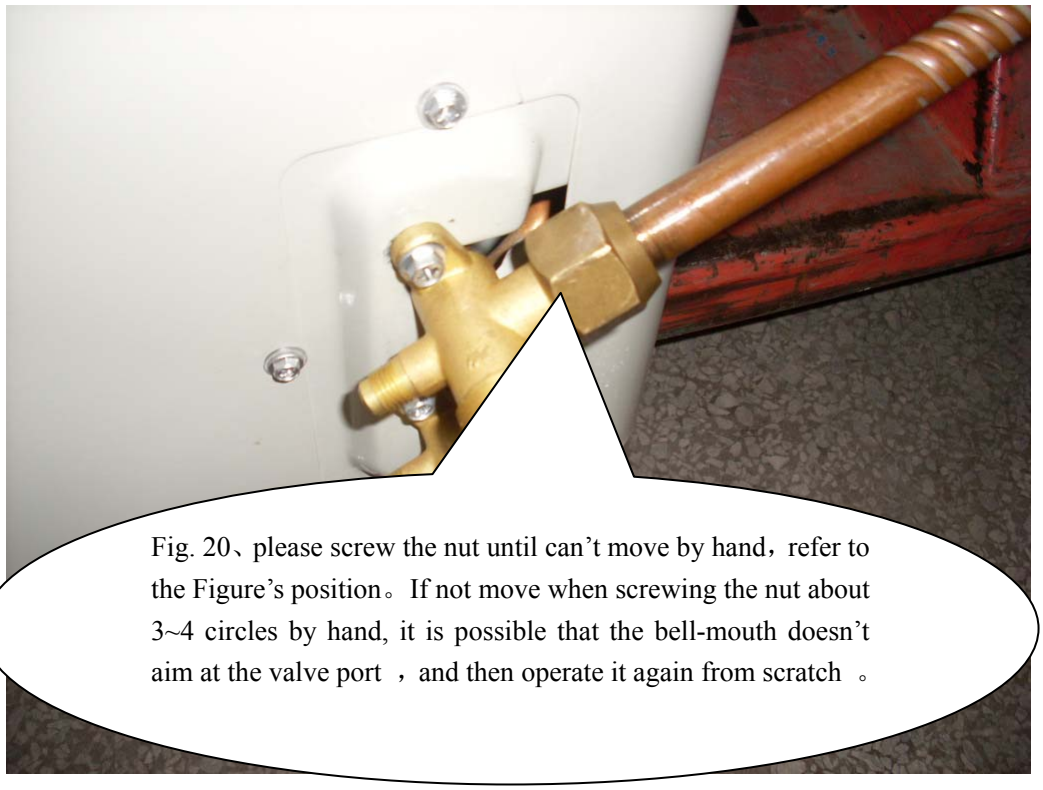
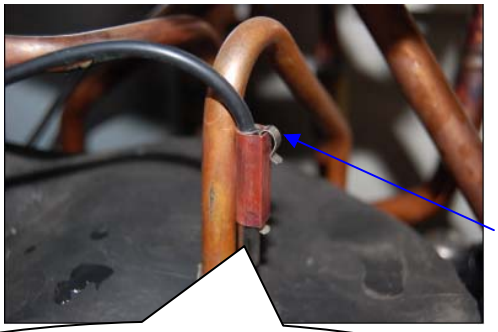


Fig. 20、please screw the nut until can't move by hand，refer to the Figure's position。If not move when screwing the nut about 3~4 circles by hand, it is possible that the bell-mouth doesn't aim at the valve port ，and then operate it again from scratch 。

The following Figures are the wrong operation. such as Fig. 22、Fig. 23

Fig. 23、forcing to screw the nut by spanner results in the rupture of the bell-mouth.



The spring gasket

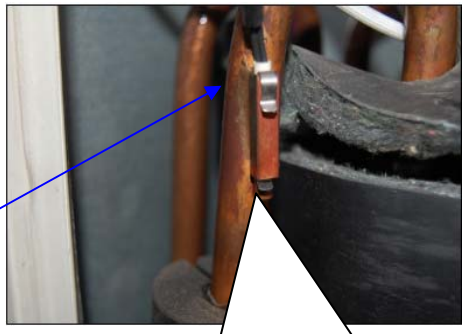
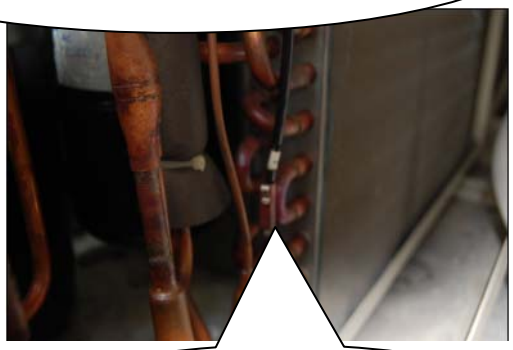


Fig. 24 the compressor's discharge temp sensor (no pipe No.) locating on the compressor's outlet gas about 5 CM

Fig. 25 the compressor's suction temp sensor（pipe number：4）locating on the Shock Absorbers piece above 5CM.



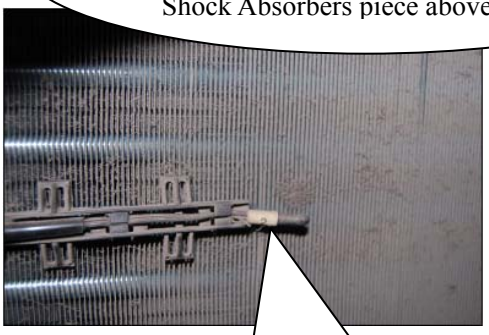
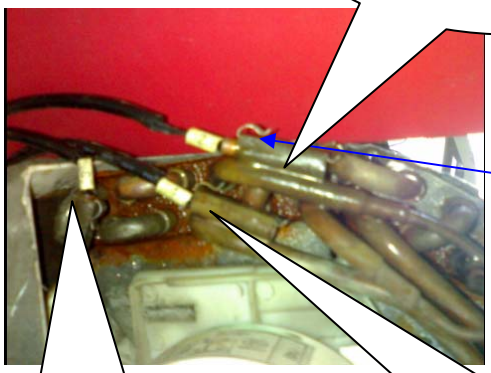


Fig. 26 the outdoor condensing temp sensor（pipe number：3）in the U-type pipe at the middle of the condenser.

Fig. 27 the outdoor ambient temp sensor（pipe number：2）locating on the condenser's back，

Fig.28.3 The indoor evaporator's inlet temp sensor (pipe number: 2)



The spring gasket

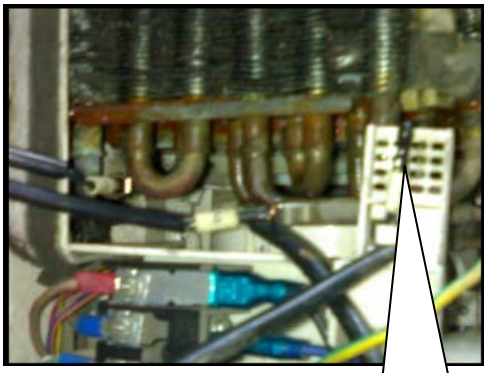


Fig. 28.1 The indoor evaporator's middle temp sensor (pipe number: 3)

Fig. 28.2 The indoor evaporator's inlet temp sensor (pipe number: 4)

Fig. 29 The indoor ambient temp sensor （pipe number：1）

Fig. 30.The damaged spring gasket

Fig. 31 .The spring gasket is in good condition.

Note: Apart from the ambient temperature sensor, all sensors must be equipped with spring washer, please check it by Fig. If the angle is similar to Fig. 24, means that spring has lost its elasticity .please bend it to an angle of 135 degrees, Re. Fig. 8; Please ensure to install them if no spring washer,.

12，The malfunction code: FF (The outdoor unit fault)

The faulty cause：
1， The motor is bad or there is trouble in the indoor PCB
2， The outdoor PCB is bad
3， Motor is bad

Turn off the power

Check the resistance value of the motor each port are normal. The reference resistance value of motor port.(Vm-GND ∞、Vcc-GND 125kΩ、Vsp-GND 200kΩ、PG-GND ∞)

N

The motor is bad or there is trouble in the circuit. Please change it

Y

Power up and turn on the unit, check motor port voltage value whether the VCC and Vm are normal (the normal voltage value:VCC:15Vdc，Vm/P:340Vdc，Vsp:0~5V)
Refer to Fig. 32

N

The outdoor PCB is bad. Please change it

Y

The motor circuit is bad. Please change this motor

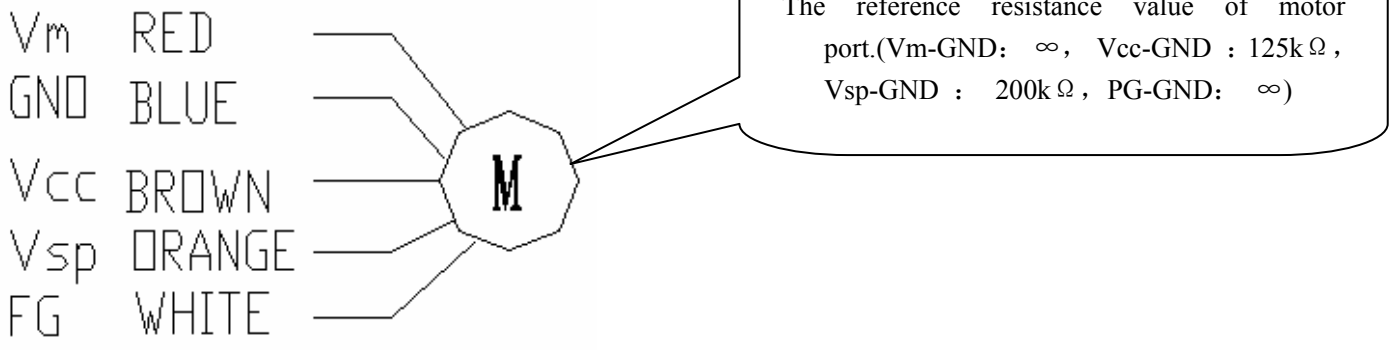


Fig.32 the DC motor

13, The malfunction code:

FC （outdoor unit drive fault, start compressor failure）

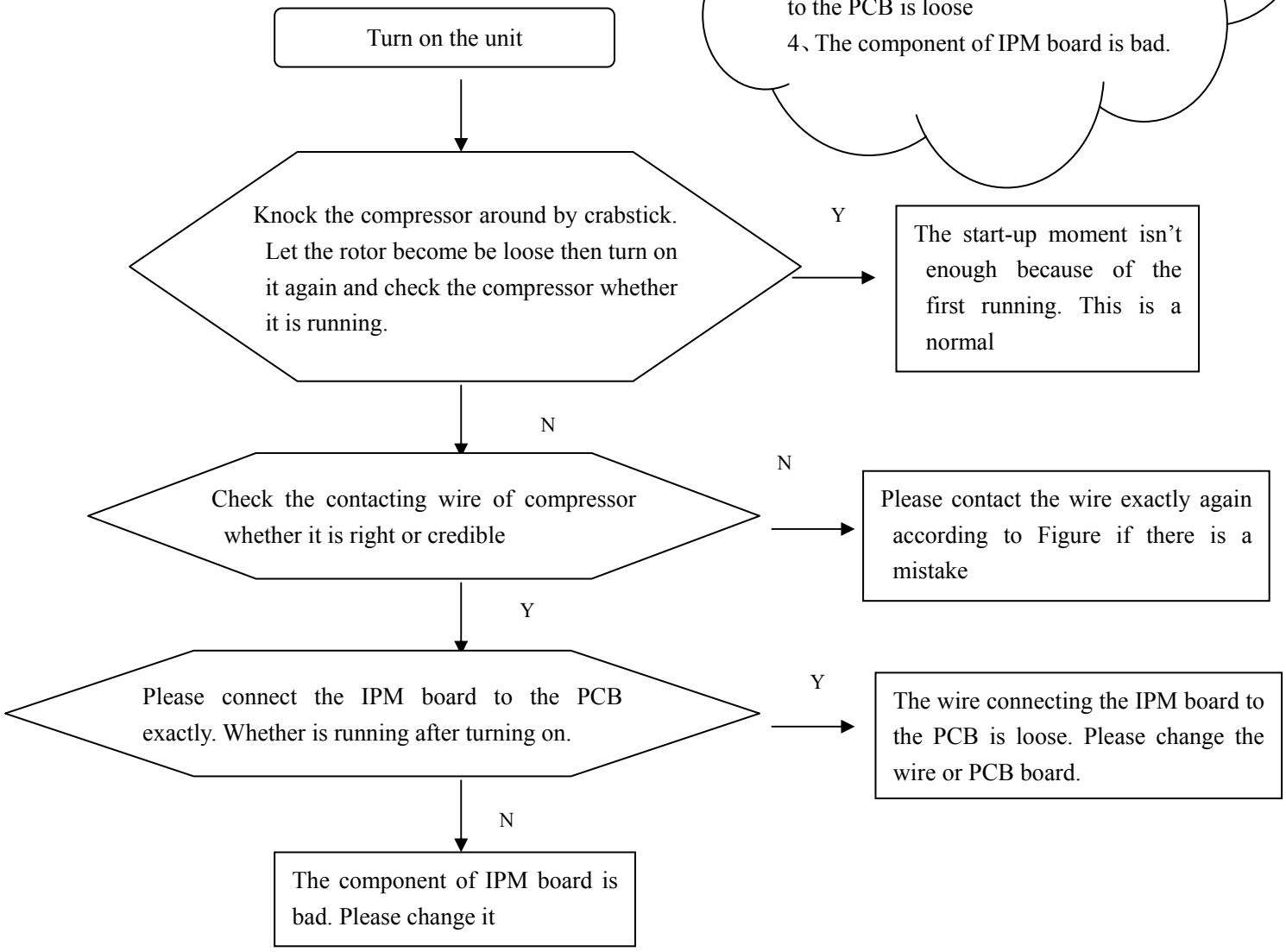
The faulty cause:

1、The start-up Moment doesn't reach the requirement when the compressor runs firstly.

2 、 The contacting wire of the compressor is connected wrongly;

3、The wire connecting the IPM board to the PCB is loose

4、The component of IPM board is bad.


Turn on the unit
Knock the compressor around by crabstick. Let the rotor become be loose then turn on it again and check the compressor whether it is running.
Y
The start-up moment isn't enough because of the first running. This is a normal
N
Check the contacting wire of compressor whether it is right or credible
N
Please contact the wire exactly again according to Figure if there is a mistake
Y
Please connect the IPM board to the PCB exactly. Whether is running after turning on.
Y
The wire connecting the IPM board to the PCB is loose. Please change the wire or PCB board.
N
The component of IPM board is bad. Please change it